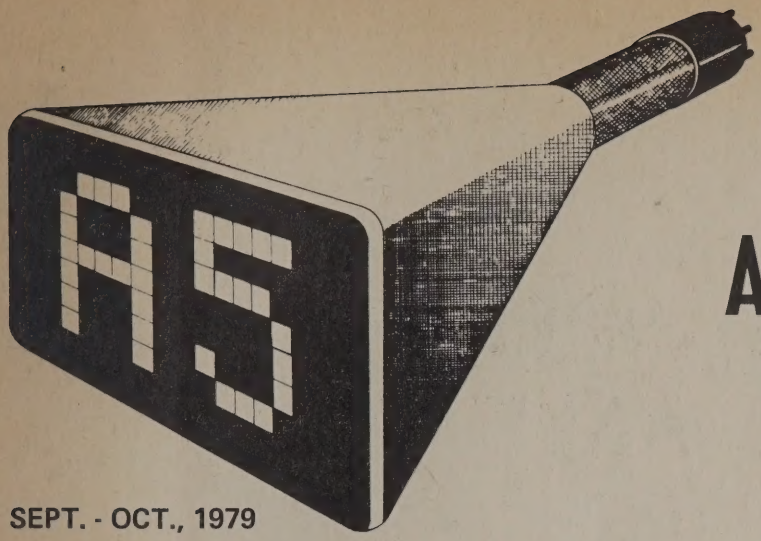

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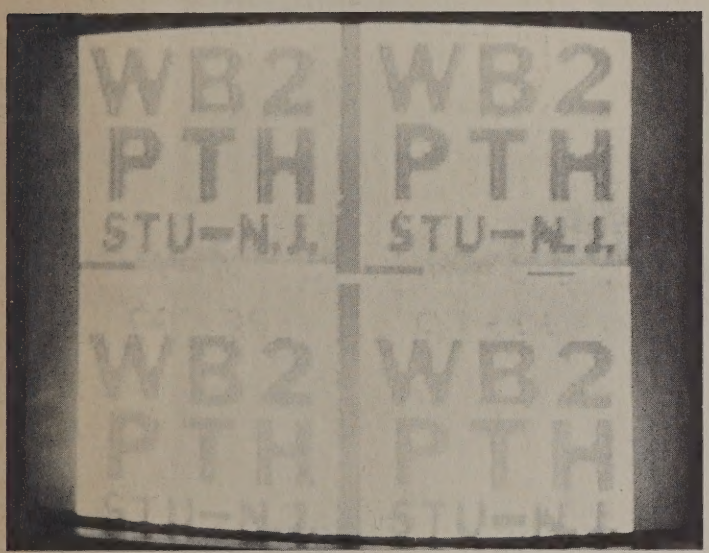
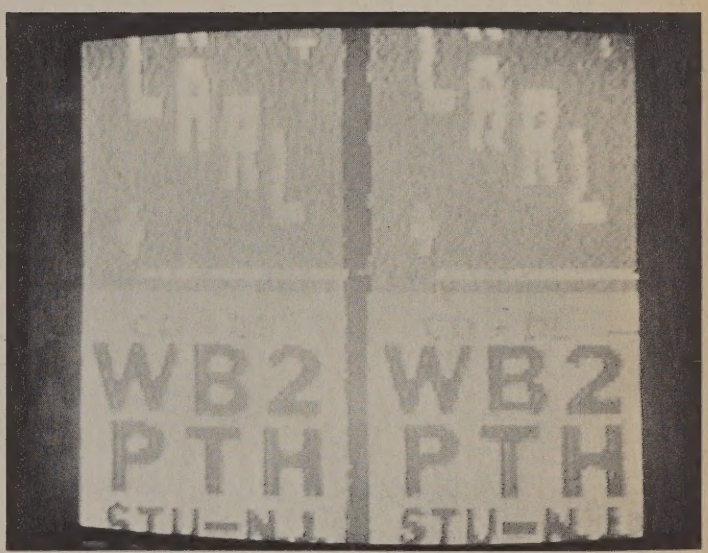
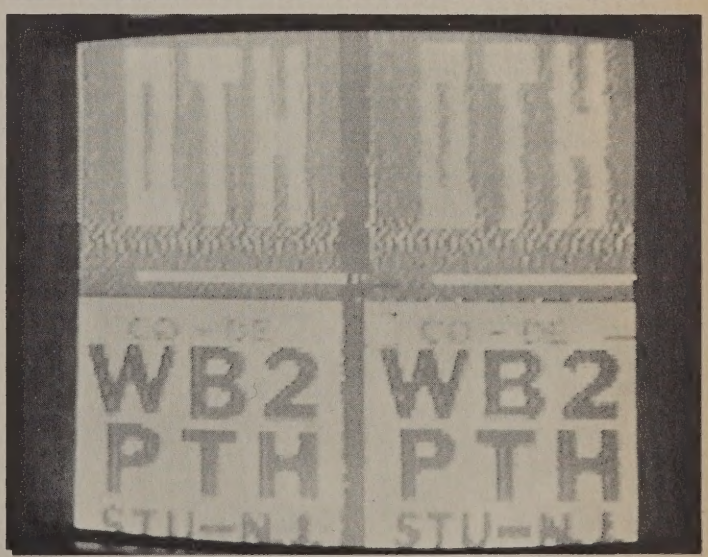
AMATEUR TELEVISION MAGAZINE

SEPT. - OCT., 1979

Vol. 9, No. 5







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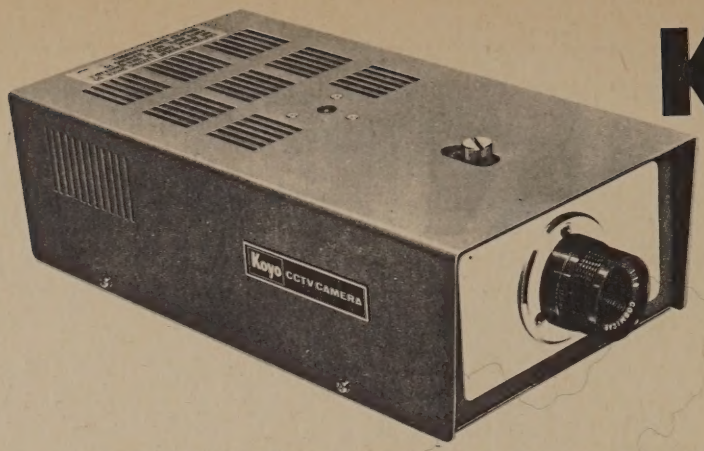

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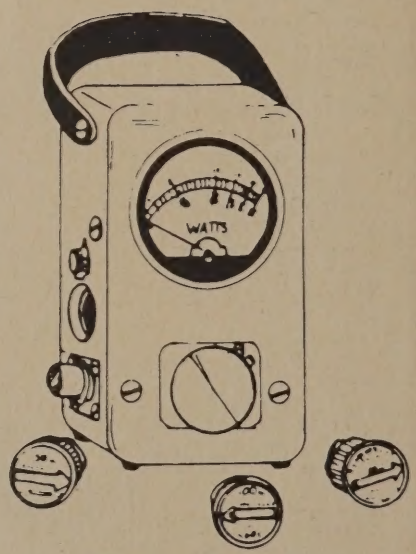

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NEWS #1

IOWA SSTV'ER WINS FIRST MASTER SCANNER AWARD

The first MASTER SCANNER award was given to MIKE STONE WBØQCD on August 24th. Of the seven catagories Mike's is the first award and was apt reward for his activity on 10 meter SSTV. Mike has 115 contacts, 22 states and 10 countries on 10 meter SSTV in just 8 weeks. His august 18th conquests included YV1DEH, KH6SB, W7KSH, VK3AIH, ZL1BLV, LU4DGN and LU4DOW. Congratulations Mike on a job well done.

Details of how you can earn an award are elsewhere in this issue. See you on SSTV!

The Grant County ARC (IN) provided an exhibit at the county 4H fair July 22-29. Included in the exhibit was an operating ATV station using PC Electronics modules housed in a plexi-glass box so the public could see the "works". There was even an offer by one visiting farmer who wanted to buy the ATV station to monitor acitivty in his barn! Elated with their experience, the group is planning an ATV repeater for Marion, IN. tnx WB9NOE.

Several inquiries about vestigial sideband filters. Outside of building them yourself using the interdigital technique shown in past Handbooks, the only source of commercial filters I am aware of is Spectrum International which is also available from PC Electronics. Aptron Labs may also be marketing the SI unit, or producing their own.

DE: Sam WA3IUH: I'm pleased to report that the Philadelphia Area Repeater Association announces that they are planning an ATV repeater for the Philadelphia area.

It will start as a beacon on 421.25 and 4.5 Mhz subcarrier sound into a 200 watt amp amp with a 10 DB antenna vertical polarization. The repeater location will be on top of Valley Forge Mountain just north of Philly. Antennas will be on a 100 foot tower tower. They hope to have the beacon on the air by mid-september running from 7:30 to 8:00 local time, 7 days a week. Input will be on 439.25 + subcarrier sound 443.75-

NATS

Northern Amateur Television Society located in Rincon Valley, CA has 12 members on the air from the remote areas north of San Francisco. They also sent us a new electronic term glossary, which is later in this issue. TNX WA6RDA

Don Mason WB6FUS wrote to say that he liked the article in CQ and used it to help pass his Advanced exam. Good work Don!

Jack Jackson WB4EFZ writes to say that ATV is alive and well in northern SC. Jack purcha chased a T-282 from the FAA then saw our note in a past issue of A5 which explained its use on ATV. WHat luck. Jack would like some specific mod info. Ur in luck 'cause we just happen to have one in the shack and after a rumage or two I'll provide some help later in this issue.

The Los Angeles area has a second ATV frequency available provided by the local freq. co-oridinating committee. Tests on 426.25 are under way.

Building your own antennas? Forrest Elliot of Port Orford, OR writes on a number of topics: "...I have a spot where two channels are very weak, down in heavy snow. I can watch both video and audio response. For instance commercial channel 11 antennas with bars cut uniform and spacing have dead bars. This would be in direct contradiction to government data in the 79 ARRL handbook of how to cut and space directors.

The Motorola MRF-904 transistor...in re-wiring Kay-Towns AB-6000 TV booster ...I had an across the board jump in color of about 10-15%. The original was a BFX-89. The replacement is about $2.....

...Channel master model 1007 to 1013 a tapered yagi 7 each for each high VHF channel. The directors are each a different length. The longest close to the front 600 ohm loop. The smallest 7 bars up the ant. Now the spacing gets wider and wider as you approach the smallest bar. The dipoles are 2, 600 ohm phased together.... I stumbled on to the fact that by getting just the right diameter bar ahead of a 27.6 inch 600 ohm dipole I could couple to a 300 ohm line. The bar is 26 3/4 (round) .

Eventually I found that a one inch by 1/8" flat bar of 26 3/4 " (aluminum) works just as well.

This bar works similar on diamond quad loops however the spacing is different. Experimenters should try different bar widths, try squashing the diamond quad loop to the yagi frequency width, different baluns. If 3/8" tubigis used the tips have to be flattened. Quad reflectors seem questionable.

I realize that the impedance most used is 50 ohm for feeds from dipoles and quads. Apparently the trick is to find out the impedance they will load out on, then attempt to convert to 50 ohms by perhaps 1/4 wave matching stub. On Yagi spacing I obtained similar results on a CH 5 design some years ago. Many of the commercial yagi bars are just window dressing. Quad relfectors possibly over rated, I'm not sure.
73 Forrest Elliot, Box 675, Port Orford, OR 97465

GOODIES DEPARTMENT. Don Miller has a large supply of P-7 tubes on hand, if you want to build an SSTV monitor, or want to send one to a DX station who wants to get into SSTV with little expense. An occasional high voltage power supply is available from Venus Scientific. These are premium supplies which for some reason do not meet the high standards of commercial or military applications, but are perfectly good for any reasonable service.

AIR MOBILE ATV

Having an ATV Show??????????? Want to spark some life????? Put a camera and transmitter in an airplane. (not new) This has been done all over the place and now A5 has arranged for a permanent ATV station in a Cessna which is available for fly-bys on a you-pay-the-gas basis. If your area does not have a pilot/ham who is willing, A5 can send one to you (fair weather permitting) on a share the cost basis. The plane is equipped with a fixed mounted antenna system for 2 meters and 439.25 TV. a PC Electronics TV transmitter, 2 meter rig, Hitachi black and white camera and 2 meter FM rig.

a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5a5

Early arrivals at '78 Backyard hamfest seen from 100'

CIRCULATION

Probably not your most favorite topic, I doubt that it comes up in your conversations often, is the circulation of A5. It does come up in mine, and once a year I have to dig through the piles of papers that accumulate throughout the year and prepare a government form for the postoffice which is a statement of circulation, ownership and management. This year, while doing the subscriptions and the forms, I was curious to see how the distribution pattern had changed over the six yrs that I've been at this. (What started as a "gee it would be nice to keep the magazine going." has turned into a real job for each issue.) Well, anyway, looking back at early mailing lists showed that the real strength was in NY, NJ, OH and CA. OH was by far the biggest, second to a tie between NY and NJ. CA was a distant fourth. Now this is mail distribution, not necessairly ATV activity. Now, while I no longer keep records by state, but by ZIP code, I can't draw a direct comparison, but, in addition to about a four fold increase in circulation, the distribution has changed quite a bit. The breakdown goes like this: 3% foreign. 5% Canada. 11% New England (0's) 11% NY, PA (1's) 9% mid atlantic (2's) 7% south east (3's) 15% mid west (4's) 4% central (5's) 8% west, midwest (6's) 5% south west (7's) 3% far west (lonely folks in 8 zip land) and a whopping 20% west coast (9's). California has a 2:1 lead over Ohio now. The big states are PA, NY, CA, IN, OH, VA, MD, NJ. Now you acute folks will catch that it adds to 101%, that's 'cause I rounded off the percentages.

Now you probably are wondering why the sub rate was upped by 50¢ per year also. Inflation to be sure, but we have been able to keep the printing costs of A5 in line by switching to the larger format, but cheaper paper. It still costs about $450 per issue, but we get more copies, and more pages, as well as bigger pages. For example, the last small size format issue was Nov 78, It was 36 5.5 x 8.5 pages. May 79 was 36 8.5 x 11 pages. Twice as much room as before! Our sub rates have only gone from $4 (1975) to $6.50 (79). an increase of 63% for a 100% increase in goodies! Actually, we went to $5 in 1976, so the increase over 1976 was 30%, and the 78 price (last year of the small size) was $6, so the increase was only 8% when we doubled the size. The increases in circulation helped get the cost per copy down which also let us run some full color covers and the special WARC issue. The real killer has been postage. It used to cost about $9 to mail out an issue. The latest was $62.56. If we multiply the $9 by 4 to reflect the increase in circulation, we get $36, but the cost is 74% higher. OUCH. I also try and get out the current issue to new subscribers by first class mail, rather than wait until the next issue to include it in the bulk mailing. So far this year, the "regular"mail and "new subscriber" issue mail has cost about $500. and we have two more issues (including this one) yet this year. Ugh.

The price of success!!

SSTV AUTOMATIC CQ BEACON by Mike Stone WBØQCD

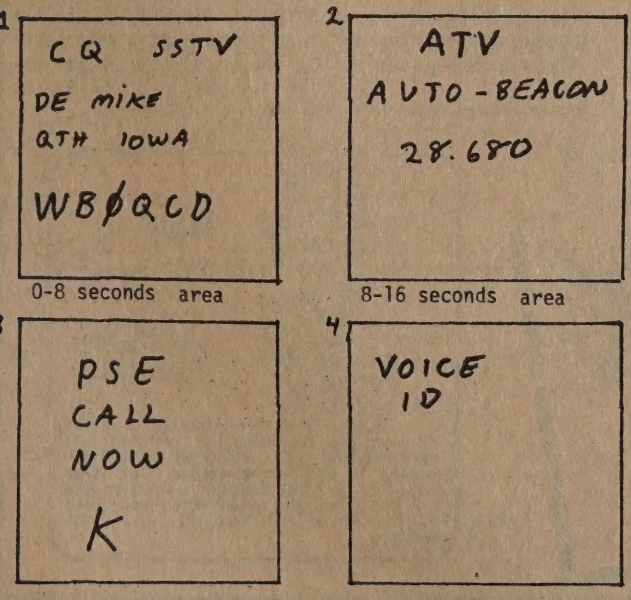
SSTV enthusiasts, expecially 10 and 15 meter buffs, quickly realize how many times the band is open into many areas but because of lack of ATV activity as we scan across 28.680 and 21.340, we simply mill a lot of contacts because of all of us listening instead of calling CQ.

In a few minutes experimentation with my Yaesu FL-101 and FR-101 combination, my Robot 400 and my cassette tape deck-- I stumbled on a very efficient way to solve the above problem as well as keep the frequency open for SSTV activity; I am sure with a little ingenuity, any rig with VOX keying can be made to woek automatically also.

Using a prerecorded or endless loop cassette with your CQ framework, program the tape from 2 to 5 frames only with a suggested 30 to 60 second interval between messages. With correct adjustment between the recor der's output into the Robot 400 converter (or cir-ectly) set the rigs' VOX circuit gain, anti trip and delay segments so as to have the audio tones trip the VOX relays when the frames come up. It must be noted that the Robot 400 left in "memory" position will not work as it generates a continous signal in this mo mode. The system works best in the "tape" position on the 400 with the mic gain and recorder out put advanced a little higher than normal. Whenthe frames end the VOX circuit un-keys the transmitter until the next frame. Thus with a properly pro grammed cassette tape and tripping circuit one has an automatically controlled CQ or Beacon station with brief on-the-air keying at substantially reduce output wattage. It should be noted that the RCC re-quirements dictate a control operator to be present at all times of transmission. If one wishes to elab-orate the method by voice ID after the frames or every ten minutes, so much the better.

I have been using this method on several occasions when 10 meters seemed open but no activity was to be found. SSTV signals appear out of nowhere responding to the call stating, "they didn't even know the band was open."

A furthur refinement of the system would be to add a 555 type timer circuit to key the Robot memory on/off to process the "video" for perfect transmissions devoid of the variances found in direct tape playback.



0-8 seconds area

8-16 seconds area

16-24 seconds area

24-30 seconds area

followed by 60 seconds off period.

MAGIC LANTERN TV DISCONTINUES ATCR-3

In a letter to ATV Magazine, Doug Milne of Magic Lantern TV asked that we announce that they have discontinued the 2300-2400 Mhz down converter which they were marketing for amateurs to use in the 2300 Mhz ham band. The reason for this has been abuse in using the units to receive MDS signals illegally, which MLTV says is in conflict with their regular business.

In a related matter, the Common Carrier Assoc for Telecommunications has been going around filing suit against users, would-be users, and publishers/authors of articles which provide information on how to receive MDS signals. A recent article in 73 Magazine "You Can Watch Those Secret TV Channels" as well as the MDS discussions at the recent Satellite conference in Oklahoma City were the subject of attack, law suits and other legal manuvers calculated to prevent, harrass or seek damages. It is the understanding of the A5 staff that the court in Oklahoma City threw out the case against Bob Cooper and the Satellite symposium as being prior restraint and in violation of the first amendment, which guarentees freedom of speech and the press. The comment with the court order in Oklahoma City was to the effect that no one could prevent the distributiohn of material or information (except for copy- right) pertaining to MDS or any other activity. The judge's comment was to the extent that one could teach bank robbery and unless you actually robbed a bank in the process, there was nothing illegal about the activity.

CCAT has also sought action against individual hams and others for distribution and writing of articles by asking the FCC to revoke licenses, issue finesand other punishment provided by the Communications Act.

It is my opinion that if the CCAT is so worried about their secrecy that they could utilize any of the signal scrambling devices presently available, as the over the air pay TV stations do. It is only their sloppy operations and disregard for their own security that makes the MDS and other systems so easy to intercept by anyone with a few bucks or a few hours time and a copy of any one of the several (dozen?) plans available. The CCAT should make an effort to provide the service at a low enough price that there is no sense in taking any risk, as most folks who bootleg the signals would be just as happy if they could pay a small monthly or annual fee for the legal right to view the private channels.

The MDS "problem" is exactly the same as the illegal use of ham equipment and linears on 11 meters. The desire is there, and no amount of enforcement will ever "cure" the problem, it will simply drive it under ground, make it more expensive, more attractive, and harder to locate. Considering the antenna size, one could easily avoid detection by putting the antenna in the attic or inside a weather vane. If the CCAT offered the service at a nominal cost, then there would be no reason to boot-leg the service and the problem would go away, but the CCAT has chosen the same course of action which has ruined 11 meters, and changed the ham equipment market and will ultimately fail, just as banning 10 meter linears has failed, as prohibition failed, as pot laws have failed, etc. You cannot legislate against the will of the people. If someone wants to receive MDS, they will weither its legal or not. It is unfortunate that MLTV has chosen to discontinue providing the equipment to hams because a few have converted the equipment for non ham use.

W A R C R E P O R T

The final US position for our region is as follows: 1860-1900 exclusive, 1900-2000 shared, 3500-3800 exclusive 3800-3900 exclusive, 3900-4000 shared, 6950-7250 exclusive 10100-10200 exclusive, 14000-14350 exclusive, 18068-18168 exclusive, 20950-21450 exclusive, 25110-25251 exclusive 28000-29700 exclusive. 220-225 shared, lose 1215-124-. Other bands unchanged for region 2 (n/s America).

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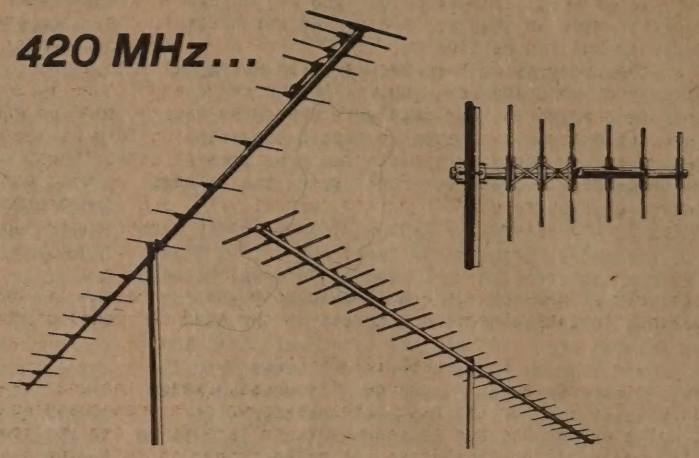
420 MHz...



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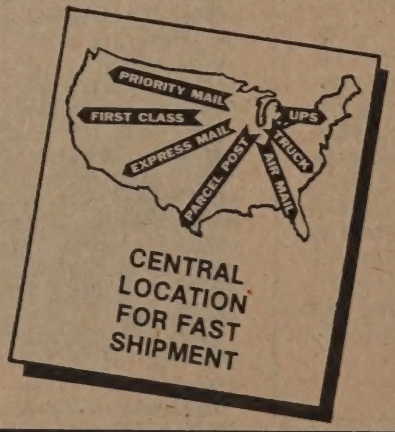

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For new subscribers, we have provided a subscription form at the bottom of this page which you can tear out and return to us with your remittance. For present subscribers, we have a little suprise. A life subscription for a new subscriber is $130.00. For current subscribers, we will accept up to December 24th, 1979, $99 for a life subscription, you save $31 over the current rate, and are protected from inflation and postage causing higher prices in the future. If you like, you can purchase a life subscription in two payments, half with your order, and half in 30 days ($49.50 each), for current subscribers, or two $65 payments for new subscribers. Now no-one knows how long any of us is going to live, or even how long ATV Magazine will continue, but, this is our 13th year of publication and I would hope that we have many more years before ATV is big enough for the major magazines to take a serious interest in our advanced modes of communication (FSTV, SSTV, MSTV, etc).

SUBSCRIPTION CODES

If you move, and send us a change of address, please include the subscription code which is the last line of the address label. For the past three years we have been changing from an all number code to a plain language code, but not everyone has had to renew yet, so here is an explanation of both systems. The new code is very simple. The month of the last issue is noted either in full, for short months (MAY) or appreviated (SEPT), followed by a two digit number for the year (80) then the type of subscription R1 stands for a one year renewal R2, two years etc. N1, a new one year, N2 a new two year, etc. When you renew, the issue after your renewal should have the new code. You can check to see if we goofed by comparing your order with the new code. If you sent for a two year renewal, but the code says R1, we goofed, and tell us about it so we can correct it. If it agrees with what your ordered, great! Since we send renewal notices between your next to last and last issues, if your renewal arrives after we have sent the issue to the printers, your code will not have been able to be changed in time. Generally, there is up to three weeks during which the list and magazine are in Kansas and we are not able to update that mailing, even though our records here in Indiana have been up dated, in which case, you may receive an issue stamped TIME TO RENEW, even though you already did. Kindly disregard unless you do not receive the following issue in a timely manner. Be sure to check the box indicating the number of years your renewal or subscription are for. If your check gets seperated in the stack of mail from the card I can't always figure out what on earth you wanted. Some ordered have arrived with no return address and a money order with only a name, or simply a bank name, so please make sure we get all the info we need to send your magazine to you. WE MUST HAVE YOUR ZIP CODE. The post office will not deliver or accept for delivery, magazines mailed without ZIP CODE unless we send them first class, which would be 35¢ per issue, which I am not going to do!

Now the old subscription code. The code would read LI774R1. The LI means LAST ISSUE, the 774 would be the year (1977) and issue number (4) which is the July-Aug issue. The R1, N1, etc code stays the same. Only a few subscriptions are left which have the old code on them, so you old timers probably know this stuff already.

NEW SUBSCRIBERS, it is our general policy to start your subscription with the earliest issue we have on hand. Generally this is the current, or immediate past issue, unless you specify in the space provided which issue you would like to start with. We do this because nearly all new subscribers want back issues, and we simply have none. We sell out of every issue, usually just in time for the next issue. Unlike the other magzines which stockpile thousands of copies we keep our overhead low and try to print just enough to meet demand. Therefore, your only chance for a fresh back issue is to get what we have at the time, or to contact one of the stores which have them for sale.

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- - - -

OKLAHOMA IS (WAS) OK!!

Those fortunate enough to attend the Satellite TV conference in Oklahoma City went home happy, broke, and ready to start building their own TVRO. About 500 persons attened the event, originally limited to 350. The SRO crowd was just as happy anyway. There were 10 commercial exhibiters who were displaying everything from LNA's at a kilobuck each, to complete TVRO systems for $11,000. The facilities could not have been better. The South Oklahoma City Community College had excellent in-house video facilities as well as a great physical layout, good food and clean pleasant surroundings. Accomodations were adjacent to the College. More than 50 attendees took advantage of the in-house CCTV system to record (all at the same time!) the various lectures. The three day event was even extended to a fourth day to accomodate re-play of the more interesting sessions for viewing or dubbing.

For your $125, you got an excellent series of receiver design sessions, one good and one fair home brew TVRO series and some literature, which included the two home brew systems.

As is appaeent, the legal system is not equipped to handle the new technology, and as such home TVRO's are still in the gray area between legal and not legal. Some satellite signals are available without furthur effort, there for the taking. Others, such as HBO, Showtime, MSE are private and require the permission (usually with a fee) from the owner (usually the service). As such, there was an effort and one company offering a registration service, through which the home TVRO owner could signify his willingness to pay (the fee) for receiving the signals, even though there is no system presently set up where one is able to pay. HBO has said that they will not accept payment from individuals. Thus the problem(similar to that on MDS reception covered elsewhere in this issue).

One came away from the meetings with one of several impressions. 1. You needed to have a lot of $$$ to purchase a ready to plug/play system ($4000 to $15,000 depending on sources and weither you helped or just watched) or a lot of time to scroungs surplus equipment, modify it, build it, test it and make it work, or some prior experience, test equipment of knowledge in microwave land to get a working system.

International Crystal Manufacturing (OK city) had a complete receiver for $1995. Another for $1500, noth tuned all 24 channels. LNA's sold for a kilobuck and were selling better than gas at 20¢/gallon! The antenna seemed to make the big difference.in pix quality. The best commercial systems, using 120°K LNA's on the "erector set" antennas still had speckels in the picture. The same receivers on the "commercial antennas of equal size had perfect reception.

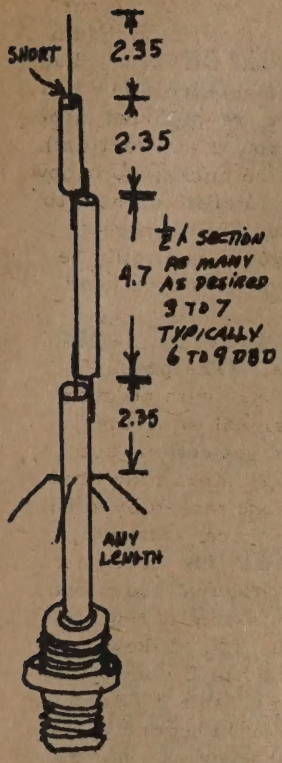
With receivers in the $2000 range, LNA's at $1,000 and antennas (fixed mount) in the $1,000, you could put together a working system for $4,000. However, you would invest a good amount of your time and be able to watch only 1 satellite. Presum ably the one with all the movies and networks. To change to another satellite would require a few hours to move your antenna, re-aim it, re-polarize (since the signals are not exactly horizontal and vertical). So, if you have the desire, and the bucks, do it now. There is talk of scrambling the satellite signals to prevent unauthorized interception (TVRO home systems) and the system used would assuredly be more sophisticated than the simple systems used by pay TV and cable TV operators which hardly require more than a basic understanding of what a TV signal looks like to decode. (The present "coding" systems are a joke) Thus, with no guar entee of there being a "clear" signal to receive, you could spend your money and get nothing but junk in a few months, or, the operators may think it over and find that they can make money by selling you the service at a reasonable price. Afterall, the idea of a wired nation is bunk. The economics of providing good cable signals in rural areas even to my house, which is on the outskirts of town is such that I will never see cable TV. Likewise, many folks in the neighboring city of Bloomington, population 50,000 will never see cable TV because the company does not intend to build beyond certain high density (apartment houses) to private homes which cost more per household (CPH). These folks are in it for the money, nothing else, so instead of complaining how much they are losing because of "bootlegers" (who they couldn't serve anyway) they should be thinking of how to cash in on the burgeon ing desire to receive quality pictures which have not been screwed up by the sloppy operation of the local network outlet TV station. Even Indianapolis (21st market) has but one station which doesn't change from purple to green flesh tones when switching from network to local (or film to tape). One out of six!

So, if you have access to some equipment, and want to take your chances, do it now. There will be additional seminars in the Oakland and Orlanda areas in the near future. Write to Bob Cooper K5KHT, Box G, Guthrie, OK for info. Bob is also offering a $50/yr magazine which will include program guides for all the movie channels and hobby information. Was it worth $125? Yes!

73 Henry KB9FO

PS. The scalpers have been selling worthless TWT amps as preamps for TVRO's. with 30 DB gain and a 28 DB NF, you get 2 db. Bad bad bad.

1265 MHZ OMNI ANTENNA



"Big stick" coaxial colinear antennas have been popular for repeaters for some time and are available commercially except for 1200 mHz. They are also described in the ARRL repeater and VHF handbooks, but when attempted the results are often disappointing. The reason for this is that the velocity factor of coax may vary as much as ± 10%. Also the tightness of the braid is a factor such that the electrical length of the piece you cut may not be close enough to the desired frequency. The VSWR can be low in some cases but the radiation pattern may be bad. Since 1200 mhz makes the cutting error greater I decided to use brass hobby tubing and make the elements full size since the dialectric can be air with no velocity factor and there is 100% shielding. For any other frequency the lengths are determined by the formula 492 divided by frequency. Then multiply by 12 for the ½ wave length in inches. The original repeater antenna measured 7 dbd with 3 ½ wave center sections. The only thing that limits gain by adding more sections past about 7 is coupling efficiency. The center conductor is 1/8" dia brass brazing rod. To keep the coax near 50 ohms the ratio of diameters must be about 2.3 to 1. Brass hobbytubing with a od of 5/16 came the closest with a id of .275. The Z of 47 ohms is close enough. The 4 radials are 2.5" long pieces of brazing rod. To keep the rod concentric in the tubing nylon shoulder washers normally used to insulate the screws holding down TO-3 power transistors work well. Use only one at each joint so that the spacing between brass tubes is as small as possible..1/16". 3/4 id brass or copper water pipe can be used as a strong clamping surface for attaching to the tower. Cut it to the length between the flange of the UG-680 type "N" connector and the radials. Solder it at both the connector and radial ends. The trick with any of these connections is to get on and off the connectrion fast with a hot iron with a lot of thermal capacity. I used a Ungar 4038 50 watt element. Its small but has a lot of thermal capacitysuch that when you touch the work it really dumps the heat without cooling too much. It also helps to steel wool and then tin all the brass before joining. This helps when first joing the pieces to tack them together quickly. When complete and tested, a piece of sch 40 1" PVC with a end cap can be slid over the elements and epoxied to the brass or copper 3/4 pipe. 4 slits can be cut about ½" long at the bottom of the PVC so that the pipe can slide past the radials.

The length for 434 mhz is about 13½" for ½ wave. Most hobby tubing is only 12" long but a short splice can be made with the next larger size as long as the two 5/16" pieces are tight against eachother and the 11/32 piece is small and sweat soldered well together. If you find longer pieces of tubing make sure the inside diameter is between .275 and .312.

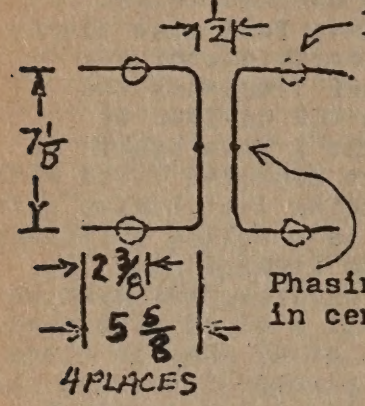
This antenna is DC grounded by the short at the top section. So you may want to solder the short last. This was yuu can check for accidental shorts at the joints with a ohmmeter. Also if you have any antennas that are not DC grounded you are more susceptable to blowing out the receiver during electrical storms. Usually just adding a 1 uh RFC at the coax feed point will do the job and not affect the gain. This way a charge wont have a chance to build up on the driven elements and possibly discahrge thru the front end of the converter.

73 DE W6ORG

1240 MHZ EXTENDED-EXPANDED COLINEAR
DE SAM K6VLM

THIS ANTENNA ORIGINALLY APPEARED IN THE MAY 1970 ISSUE OF THE SO CAL ATV CLUB BULLETIN. IT IS REDRAWN AND PRESENTED HERE DUE TO THE REINTEREST IN 1240 MHZ ATV. THIS ANTENNA IS EASY TO CONSTRUCT FROM BRASS WELDING ROD AND BRASS HOBBY TUBING AND GIVES ABOUT 14 DB GAIN (HONEST) OVER A DIPOLE.

½ FRONT VIEW



DRIVEN ELEMENTS

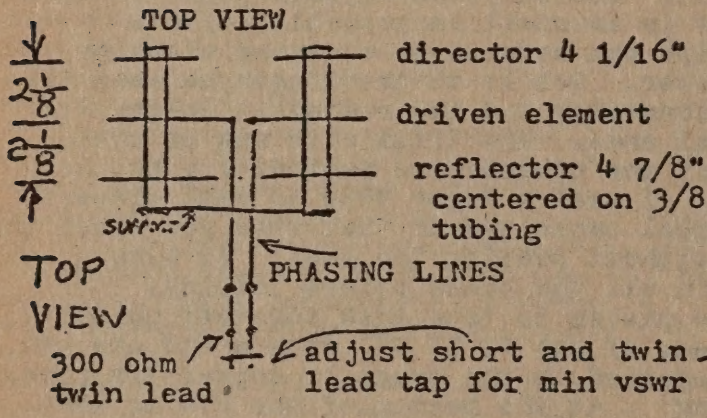
3/8" DIA BRASS HOBBY TUBING-make 8 pieces 6" long drill 1/8" hole ½" in from one end and two more at 2 1/8" intervals

MAKE TWO SETS space the sets 7 1/8" apart one above the other

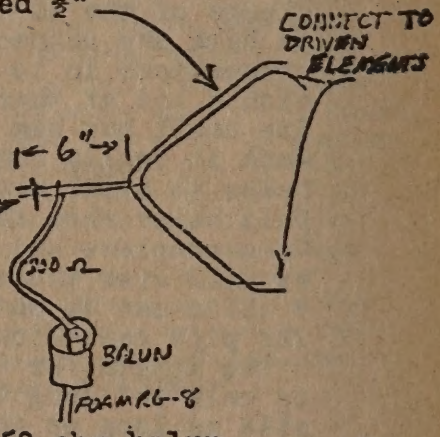
MAKE 8 SETS OF DIRECTORS AND REFLECTORS

Phasing lines connect in center

HOLD ALL DEMENSIONS TO WITHIN 1/16" Steelwool and pretin all solder joints before assy. After tuning spray with 3 coats of clear epoxy paint.



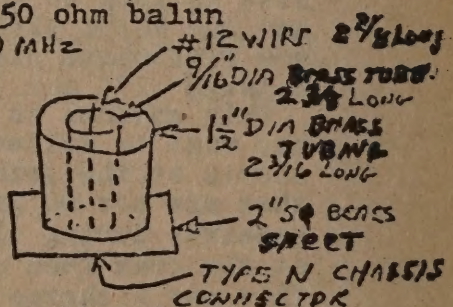
PHASING LINES
Made from two 18 1/8" long pieces of 1/8" rod spaced ½"



THE ANTENNA IS TOO DIFFICULT TO SKETCH IN ITS COMPLETED FORM AS ONE VIEW DOES NOT SHOW IT ALL. BUT IF YOU CONSIDER IT BASICALLY AS A METHOD OF STACKING AND MATCHING 8 THREE ELEMENT BEAMS YOU MAY GET THE PICTURE (hi) THE FRONT VIEW SHOWS 4 OF THE DRIVEN ELEMENTS WITH THEIR ATTATCHMENT TO THE BOOMS AND END FEEDING THE DIPOLE ELEMENTS. THE ½" LINE SPACING CAN BE HELD WITH PLASTIC SPACERS BUT MUST BE PUT ON BEFORE SOLDERING. HEAT SINK TO PREVENT MELTING. USE 1" brass rod 1/16 or 1/8"thk TO CONNECT THE BOOMS AND CLAMP TO THE MAST.

73...W6ORG

300 to 50 ohm balun
1240 MHz

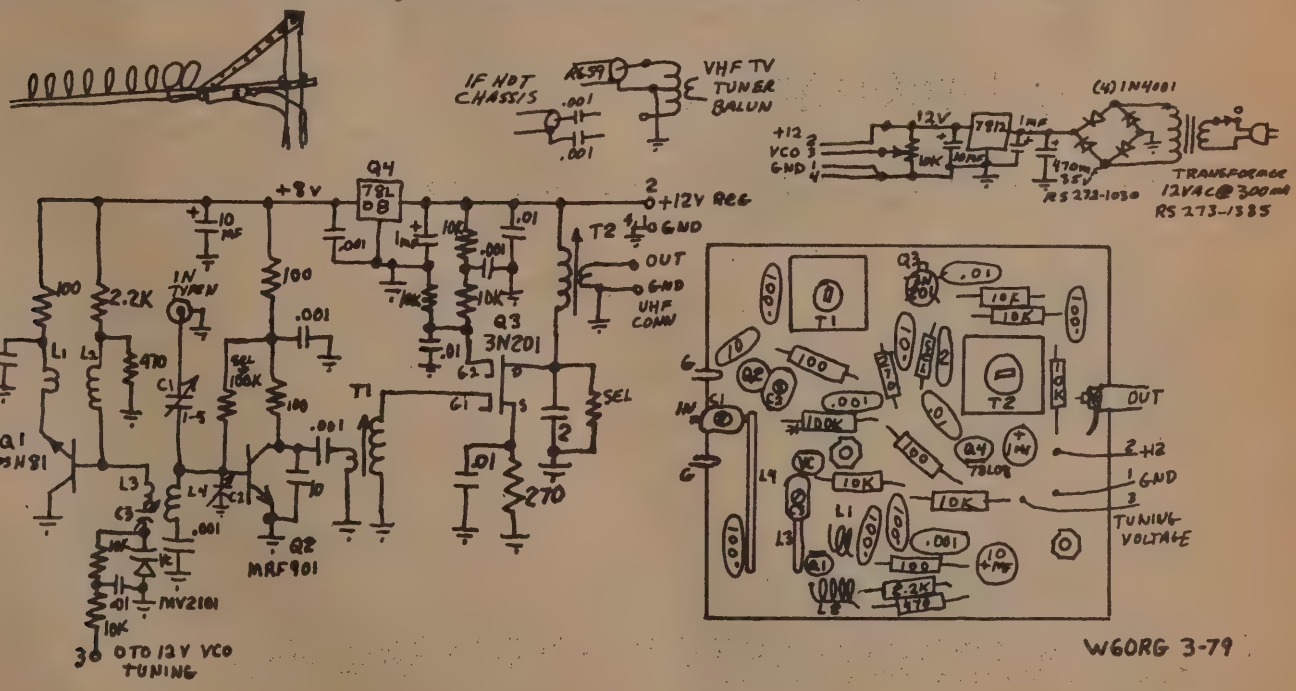


Construction is the same as the beer can balun as in the VHF Handbook.

TVC-12 1215-1300 MHZ ATV CONVERTER

This ATV converter is designed to be mounted at the antenna to receive 1215 to 1300 mHz signals with minimum loss. The output is on tv channel 7 or 8 which has 7 times less loss than if you ran the same coax line from the antenna to the converter in the shack. The converter is best attached to the antenna with cable ties or hose clamps..do not drill any holes in the case for mounting. Also do not attach with the mounting plate facing upward so that chances of water getting in are minimized. Best position is with the control cannector downward. As with any antenna system, take the time to spray 3 coats of clear epoxy paint on the antenna and all connectors, then tape the connectors and the converter cover edges. Oxydation can really destroy the high gain of the antenna and cause intermods. If you are mounting the converter on the Spectrum International 1296-LY antenna, carefully bend the rigid coax over a screwdriver handle or other object with a 1" dia so as not to crack or break it. Mount the converter on the boom,connect the output rg 59 coax and control cable, then weather proof it. Mount to the mast by drilling two holes about 3" from the end of the boom for a "U" clamp. The boom can be supported by means of some plumbers tape or length of metal run at a 45 degree angle from the mast to under the screw that holds the reflector loop.

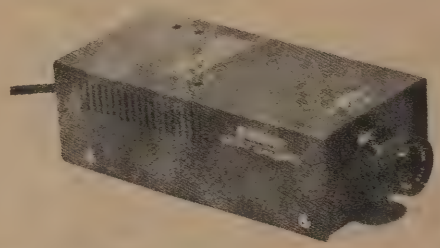
At the shack end: a 12 vdc regulated supply at 25 ma, a 10K pot for frequency adjustment, a cable for control, and attachment to the TV vhf tuner will have to be made. The supply and control can be placed in a box and a 3 or 4 wire cable (Radio Shack 15-1152 rotor cable) with a 4 pin mic plug at the end (RS 274-001). To prevent adjacent channel interferance the converter output is best connected directly to the vhf tuner input. However if the chassis is HOT to the AC line you must connect thru .001 500v disc capacitors. Clip off the twin lead and connect the braid of the RG 59 coax to the ground of the tuner and the center conductor to one of the points where the twin lead connected. Leave the other twin lead side open. This will match the 75 ohms and will also be good for regular TV. Carefully tune the freq. pot and rotate the antenna. The 1296-LY has 18 DBd with a sharp 10 degree beam width. You should be able to receive 1265 while transmitting on 439 depending on ur xmtr harmonics and antenna spacing.

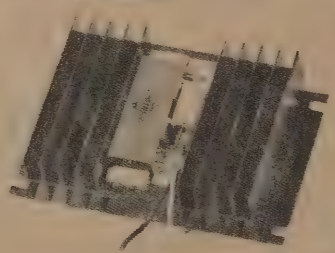


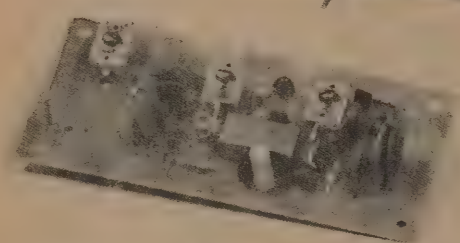
P.C. ELECTRONICS

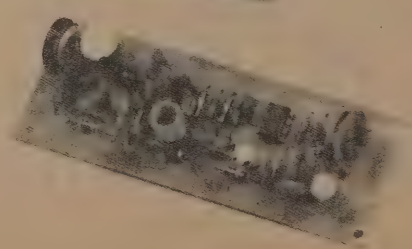
MAY 78 CATALOG OF PC BOARDS AND MODULES FOR YOUR COMMUNICATIONS SYSTEM

Solid State Fast Scan ATV Modules









ATV TRANSMITTER/CONVERTER — TC-1 . . . . . $349.00 ppd
All you need in one box. Contains the TXA5-2, PA5, TVC-1, FMA5 modules described below in a attractive cabinet with regulated power supply and solid state T/R relay. Specify 434.0 or 439.25 mHz transmit and TV receiver channel 2 or 3. Connect to antenna terminals of any TV set, add a good 450 antenna, camera or computer and you are ready to show the shack, home moves, computer games, etc.

HITACHI HV-62 TV CAMERA . . . . . $198.00 ppd
High performance CCTV camera perfect for ATV applications. Resolution better than 500 lines. Low power consumption on 117 vac line . . . 7 watts and can be modified to run on 12 VDC for mobile and portable work. Small 4x2-5/8x8 inches. C mount lens included. 10,000:1 automatic light compensation. Built in gamma correction for high contrast.

TXA5-2 ATV EXCITER . . . . . $69.00 ppd
This is a wired and tested module designed to drive a Motorola MHW-710 power module to 10 watts output. (The MHW-710 is part of the PA5 module below). The TXA5-2 consists of a crystal oscillator operating in the 100 MHZ region to keep any harmonics out of two meters, two doublers and a final. The high resolution video modulator (8 mHz) drives both the final and 2nd doubler for good linearity. Also DC restoration is used to give max power on sync tips and black blacks regardless of picture average level. Requires +12 vdc reg @ 70 ma, and crystal.
Crystal: International type 473160, 434 = 108.5, 439.25 = 109.8125 mHz.

PA5 10 WATT ATV POWER MODULE . . . . . $79.00 ppd
The PA5 will put out 10 watts of high resolution video when driven by the TXA5-2 Exciter or VHF ENG. TX-432B (attenuated down to 80mw). With this module and a good gain antenna up 40' you can see pictures usually from any station you can work on two meter FM running 5 watts.
Requires 12 vdc reg. @ 3.0 amps and 80 mw drive.

TVC-1 ATV RECEIVING CONVERTER . . . . . $49.50 ppd
No need to destroy the TV set trying to convert the UHF tuner when you have one of these modules. It connects between the antenna and the VHF tuner in the TV set tuned to either channel 2 or 3 . . . which ever is unused. The low noise preamp is built in and followed by a hot carrier double balanced mixer module. The local oscillator is tuned by a single pot which makes it easy to remote tune. Requires 10 to 18 vdc @ 20 ma.

FMA5 AUDIO SUBCARRIER GENERATOR . . . . . $24.50 ppd, $4.00 Board
Put audio on with your camera video. Connect your low Z (200 ohms) dynamic mic, +12 vdc reg @25 ma, TXA5-2 or any of the VM-1,2,3 modulators and your set to **show** and **tell**. The FMA5 has lots of mic gain and a soft limiter for pick up to 10 feet. It modulates a 4.5 Mhz VCO to the full TV standard deviation of 25 khz. Works with any transmitter having 5 mhz video bandwidth modulation.

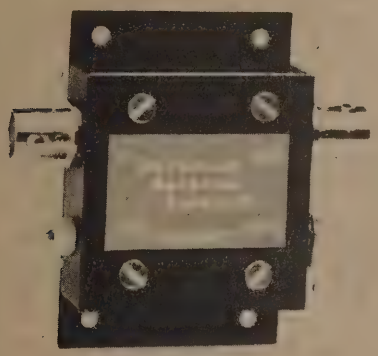
P.C. ELECTRONICS

YOUR ATV SUPERMARKET

THANKS TO THE RISING POPULARITY OF FAST SCAN ATV OUR PRICES WILL NOT HAVE TO GO UP THIS OCTOBER. INCREASED PRODUCTION ECONOMIES HAVE OFFSET RISING PRICES AND INFLATION. HOWEVER THE TIME TO BUY IS NOW WHILE YOUR DOLLAR STILL HAS SOME VALUE. THE PRICES OF OTHER MANUFACTURERS EQUIPMENT THAT WE REP WILL GO UP....J BEAMS, ADVANCED RECEIVER RESEARCH PREAMPS, AND LEEDEX MONITORS AND HITACHI CAMERAS.

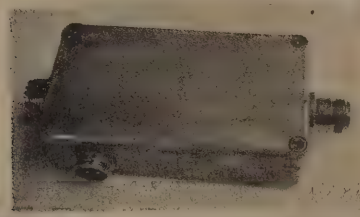
MOST OF OUR SALES ARE FOR MODULES ORDERED ONE AT A TIME AS THE STATION GETS BUILT UP. IT SAVES US TIME AND MONEY IF ORDERED AT ONE TIME. SO FOR THE REST OF THE YEAR WE OFFER A PACKAGE SPECIAL: ONE EACH TXA5 WITH XTAL, PA5, FMA5, AND TVC-1B CONVERTER FOR $225 DELIVERED. (REG $237)

CLUBS AND GROUPS CAN GET A 10% DISCOUNT ON 5 OR MORE OF ONE MODULE ORDERED AT ONE TIME TO ONE ADDRESS.....NO MORE EXCUSES GET ON ATV!!



ARR P432VD UHF PREAMP.....$28 ppd
If you are still using that converted UHF TV tuner or Science Workshop varactor tuner, you are at least 6db less sensitive than you need be. Thanks to mass production of the Motorola MRF901 transistor, the price of low noise preamps is now worth while. Noise figure is a nominal 1.8 db. some have measured as low as 1.1db. See the weak ones! If you dont have a converter yet, the TVC-1B has one built in.

BUILDING A ATV REPEATER????
We have all the modules for you to build a successful one. We even have a repeater control board for $99 that has a lot of extras on it....a 4 second alternating control for the video identifier so that your call alternates with the word repeater.... a circuit that works with the video clock board that puts on the screen a number form 1 to 99 that corresponds to the repeater receivers agc voltage so that stations can tell how well they are hitting the machine or how much more gain a amp or antenna is getting. There is a horizontal tone decoder gated with a setable agc trigger point for turning on the repeater only when the signal is video modulated...this keeps non video signals such as radar, FM, etc from tripping the machine on....and you can set the length of time for a external test pattern to come up after a user unkeys the transmitter. This way a color bar gen such as the Heath IG 5240 can be automatically come on the output for testing for say 1 min.
SEND A SELF ADDRESSED STAMPED ENVELOPE FOR REPEATER INFO.



TVC-12 1200 MHZ ATV CONVERTER .... $79.00 ppd
Tunes 1215 to 1300 mHz from the shack. Can be mounted at antenna to save line loss. Outputs on channel 7 or 8. Req. 12vdc reg @ 20 ma and 10K pot. High rejection to 439 when used with SI loop yagi for full duplex ATV.

TRY CROSSBAND ATV!
TOM W6ORG MARYANN WB6YSS 9/79

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73, TOM W6ORG P.C. ELECTRONICS, 2522 PAXSON LANE, ARCADIA, CA 91006

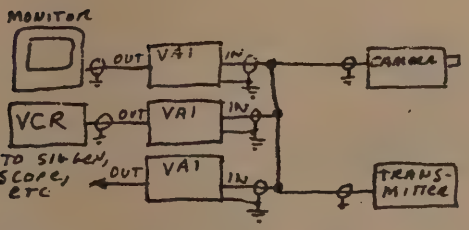
BANKAMERICARD VISA

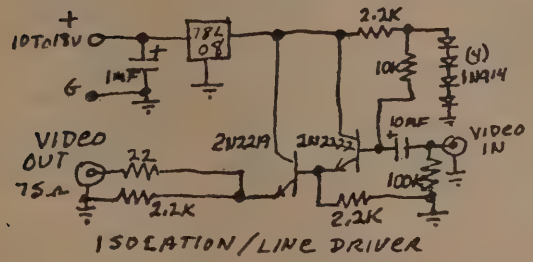
1978 HOOSIER BACKYARD
(A-5's backyard) HAMFEST

VA1 VIDEO BUFFER / INVERTER

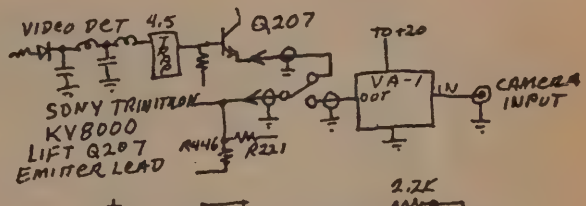
This module has two possible functions depending on how it is put together. As a buffer it can be used to drive many other monitors or output devices and not load down the video coax line. The input impedance is about 5000 ohms. The coax from the camera to the final output device, usually the transmitter, must be kept as close to a flat 75 ohms as possible to prevent poor resolution, ghosting, and phase shifting of color and high frequency responses. The line must be treated much the same way a antenna transmission line would be to prevent vswr. The high impedance input of the buffer will not appreciably load the line with up to 10 modules. They are great for part of a video swithcher and control box.

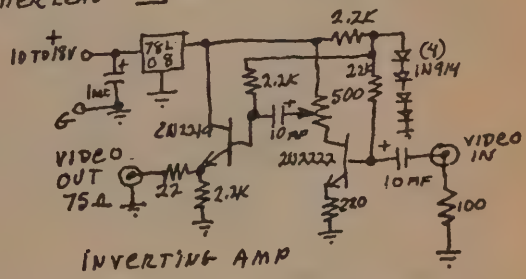
There are a few applications where the video must be inverted in phase such as when modifing a tv for use as a monitor. Also some require up to 2 volts p-p. The module in the inverter application has up to 7db gain as controlled by the 500 ohm pot. The example is shown for the Sony KV8000 color portable, but most Sonys use the same detector and emitter follower circuit. Just lift the emitter lead of the emitter follower transistor and connect it to coax to run to a spdt toggle switch. The wiper of the switch goes into the hole vacated by the emitter of the transistor. Now you can switch between off the air and monitor. By using the set as a monitor rather than off the air you get higher resolution, and is not subject to variations due to rf multipath or overloading.



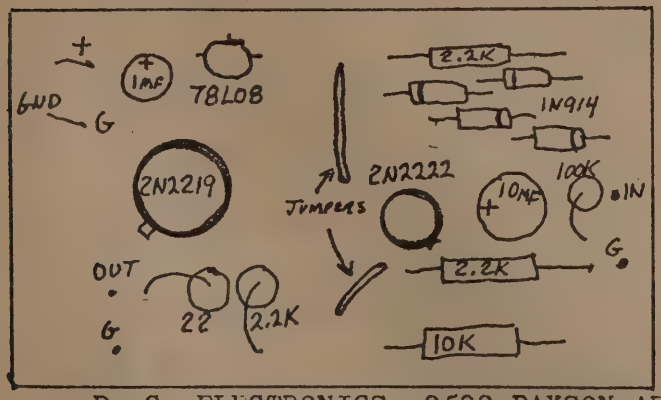


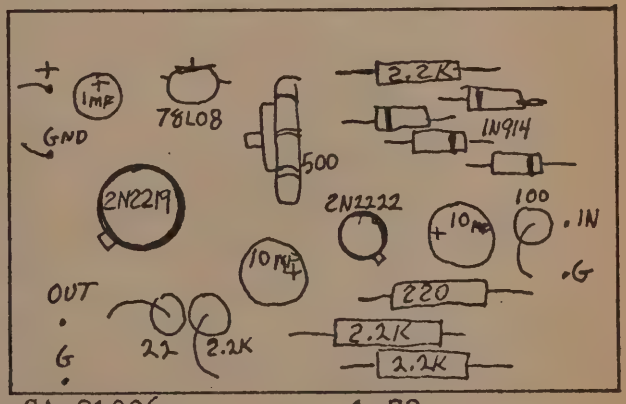
ISOLATION/LINE DRIVER





INVERTING AMP





ATV REPEATER MODULATOR

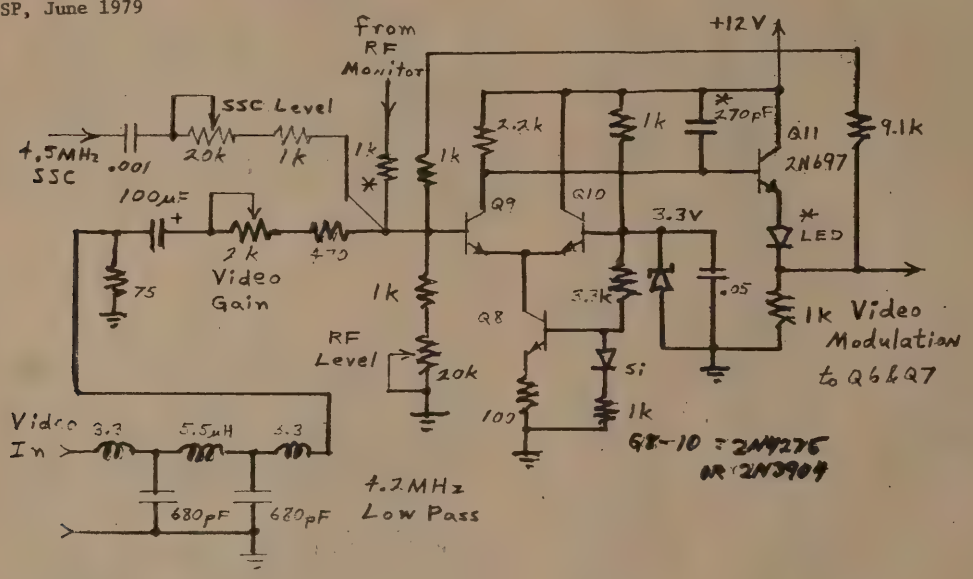
From Colorado comes QSP and their ATV repeater. This month is the repeaters video modulator.

The Modulator is designed as a descrete component, wide band operational amplifier. Q9 & Q10 are a differential amplifier pair. Q8 functions as a constant current source for Q9 & Q10. The 2.2 K resistor is the load resistor for Q9. Q 11 is an emitter follower to provide a low output impedance. The base of Q9 is the negative input of the op-amp while the base of Q-10 is the positive input. The positive input is fixed at 3.3 V using a zener diode The op-amp is connected in an inverting,summing amplifier configuration. There are three inputs, namely the video signal, a 4.5 Mhz sound subcarrier, and a dc bias (rf level). Negative feedback comes from 2 locations. A 10 K (9.1 + 1 K) feedback resistor always comes from the Q11 output. When an external power amplifier is used then detected RF envelope feedback is also used.

Three adjustments are provided: video gain, RF level (dc bias) and SSC level. To keep the output spectrum within commercial standards a 4.2 Mhz low pass filter on the video input is provided.

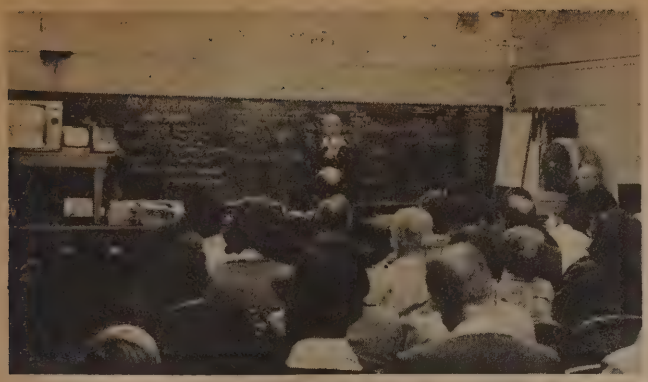
Three components are stared (*) as being optional. Tey are only used in conjunction with an external 10 watt power amplifier (MHW-710). The 1 K resistor is the RF feedback resistor. The LED is used as the equivalent of a 1.6 V zener or battery. It allows the modulator output to swing lower than the 3.3 V bias level and thus improves the depth of modulation. The 270 pF capacitor is required to limit the bandwidth of the op-amp. There is sufficnent time delay (phase shift) in the modulated esciter stages, power amp, rf envelope detector and amp to cause the modulator to oscillate at 8-10 Mhz if the op amps bandwidth were not limited. If rf feedback is not used than the 1 K resistor and the 270 pF capacitor are not used.
Jim WAØNHD.

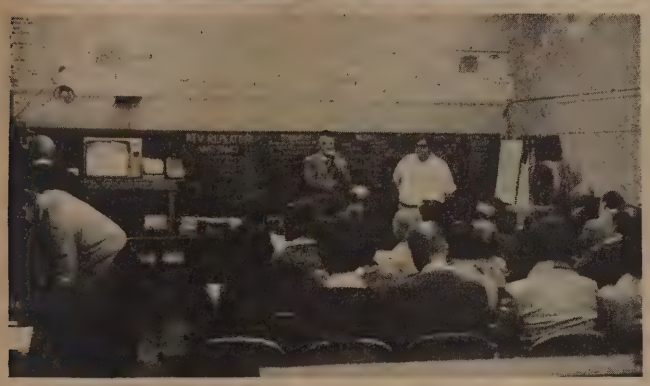
QSP, June 1979



NATS GLOSSARY

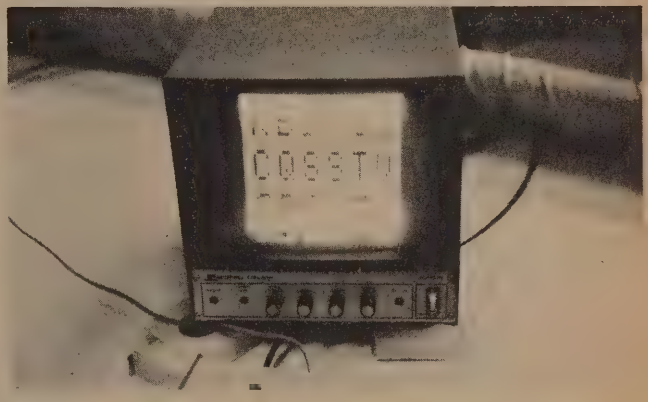
AIR CORE now known as the AIR FORCE
AMP Bug with six legs
ARRESTOR officer of the law
BANANA PLUG used on leaky bananas
BUFFER substitute for asprin
BUSS used for transporting AMPS
CAPACITOR someone who can hold liquor
CENTIMETER long critter with many legs
CHOKE what your wife does after she sees new rig
DECIBEL used to warn ships
DETECTOR someone who works for FBI
DISCRIMINATOR member of KKK
DUMMY LOAD a guy who carries his mother-in law around.
EXCITER Raquel Welch going topless
FARAD Egiptian ruler
FEED THRU a slot ina jail cell
FINAL OUTPUT taking out the garbage for th the last time
FLAT TOPPED (its hard to get excited about this)
FLUX a four letter word
FLYBACK returning on an airplane
FRONT END good example Dolly Partin's
GAMMA MATCH new game, somewhat like tennis
GROUND LOOP race car track
GROUND FAULT area known for earthquakes
HENRY Jane Fonda's dad
HERTZ when someone steps on your toes
LIGHTNING ARRESTOR a very quick policeman
LIMITER a bar tender
MIXER used in alcholic beverages
MICROFARAD son of Farad
OHM House in Ireland
PARASITIC a small bug which infests ham shacks
PHONO PICK-UP single bar discoteque
POWER DRAIN garbage dispoaal
PRE SELECTOR man who works for draft board
RECEIVER mainly used in football
REGULATOR superior court judge
RESISTOR someone who doesn't want to be arrested
RIPPLE brand of wine
SAWTOOTH a crude dental instrument
SQUARE ROOT found only on square trees
STRIP LINE chorus girls in Las Vegas
SUPRESSOR used to check for sore throats
TOROID manufacturer of lawn mowers
TRANSFORMER dutch doctor who performs sex change opeations
TRANSIENT VOLTS found in old box cars
TRIMMER used for cutting bushes
VACUUM TUBE attaches to vacuum sweeper
VFO WATT same thing as HUH
WHEATSTONE BRIDGE crosses the rio grande, used by farmers
VFO predecessor of UFO





Pix of the midwest ATV meeting in Bloomington. About 140 hams on hand to see local ATV RPT. (ul) Ron gets gear working as Presti talk about rpt system. (ur) crowd awaits first repeated video pix. (11) Don Miller and Bob Myers talk on ATV. (lr) KA9BST repeated video as received 15 miles away.

Tom, Maryann, Bruce and Warren at A5 booth, Dayton 79.



Monitor output of Robot SSTV keyboard. Makes great unit for FSTV too!

F O R S A L E

PROFESSIONAL TV CAMERA LENSES:

Zeiss, Kodak, Pentac, Wollensak 35 mm mount TV or film lenses. 20 in all.

1,	Kodak F 3.3 35 MM	$10
7,	Kodak F 1.9 50 mm	$10 each
1,	Zeiss F 2.8 75 mm	$25
1,	Wollensak F 3.5 75 mm	$25
2,	Ilex F 3.5 75 mm	$25 each
2,	Kodak F 3.5 90 mm	$50 each
1,	Wollensak F 3.5 90 mm	$50
1,	Tesar F 2.8 80 mm	$40
3,	Kodak F 3.8 135 mm	$$75 each
1,	Pentac F 2.9 200mm	$100
2,	Ilex F 3.9 215 mm	$100 each

ZOOM ZOOM ZOOM

2, Varotal V F4 40-400 zoom plus 1.5 X range extenders, remote control focus, zoom, with mounts. missing 1 cable (one complete system, one system missing one cable) with mount. $1,000 each
All lenses are good to excelent condition. Can be adapted to most cameras, use for enlargers, telescopes, etc.
Also all are shipped freight collect, or include enough for shipping, well packed. All can ship via UPS. Henry KB9FO, Box 1347, Bloomington, IN 47402

T-282

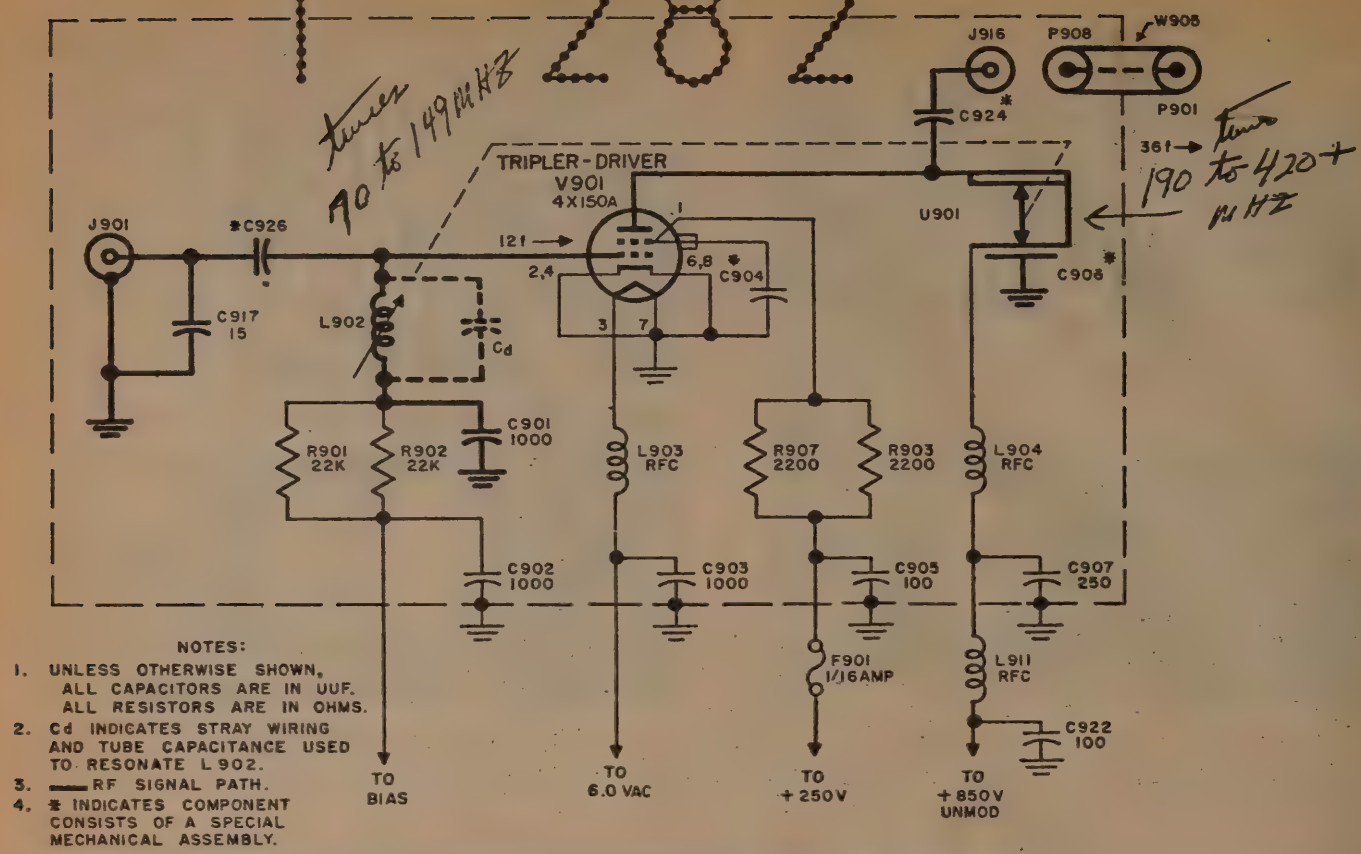


Figure 4-25. Radio Transmitter T-282/GR, Tripler-Driver, Simplified Schematic

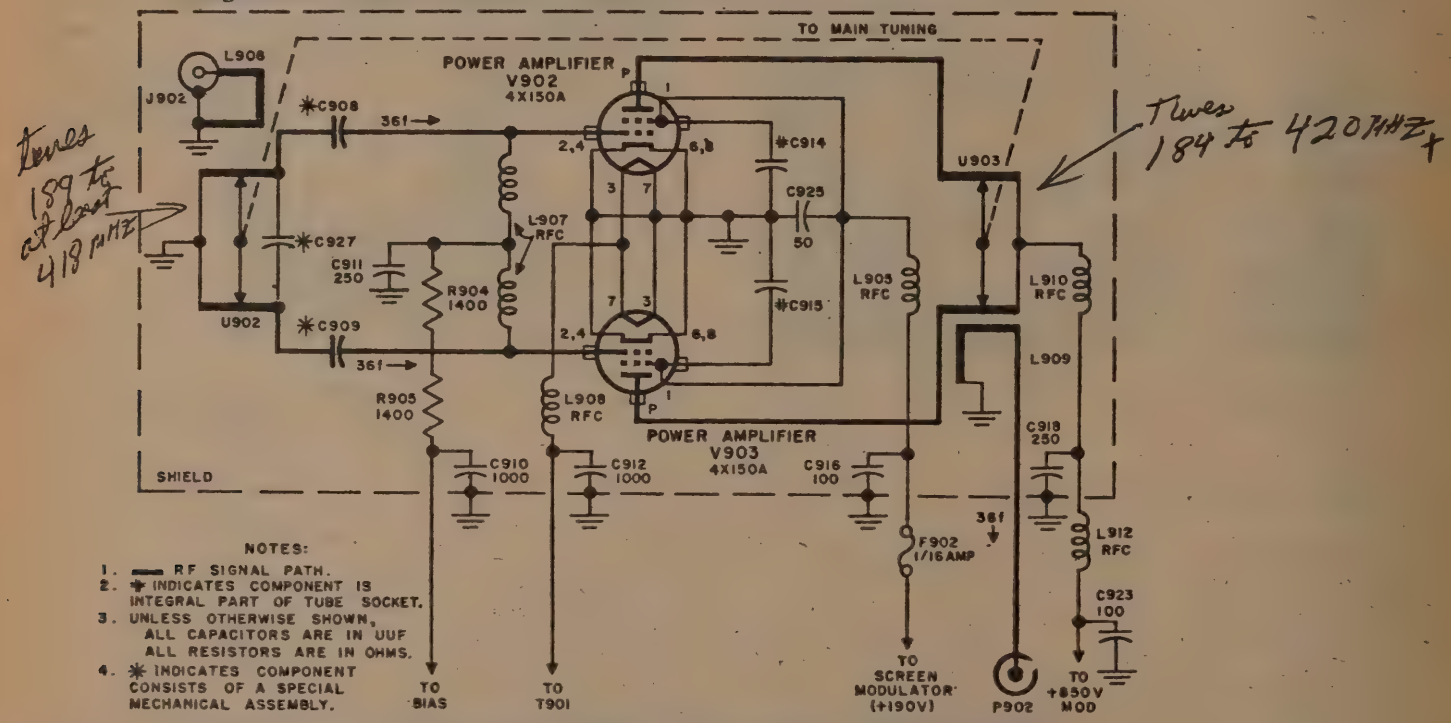
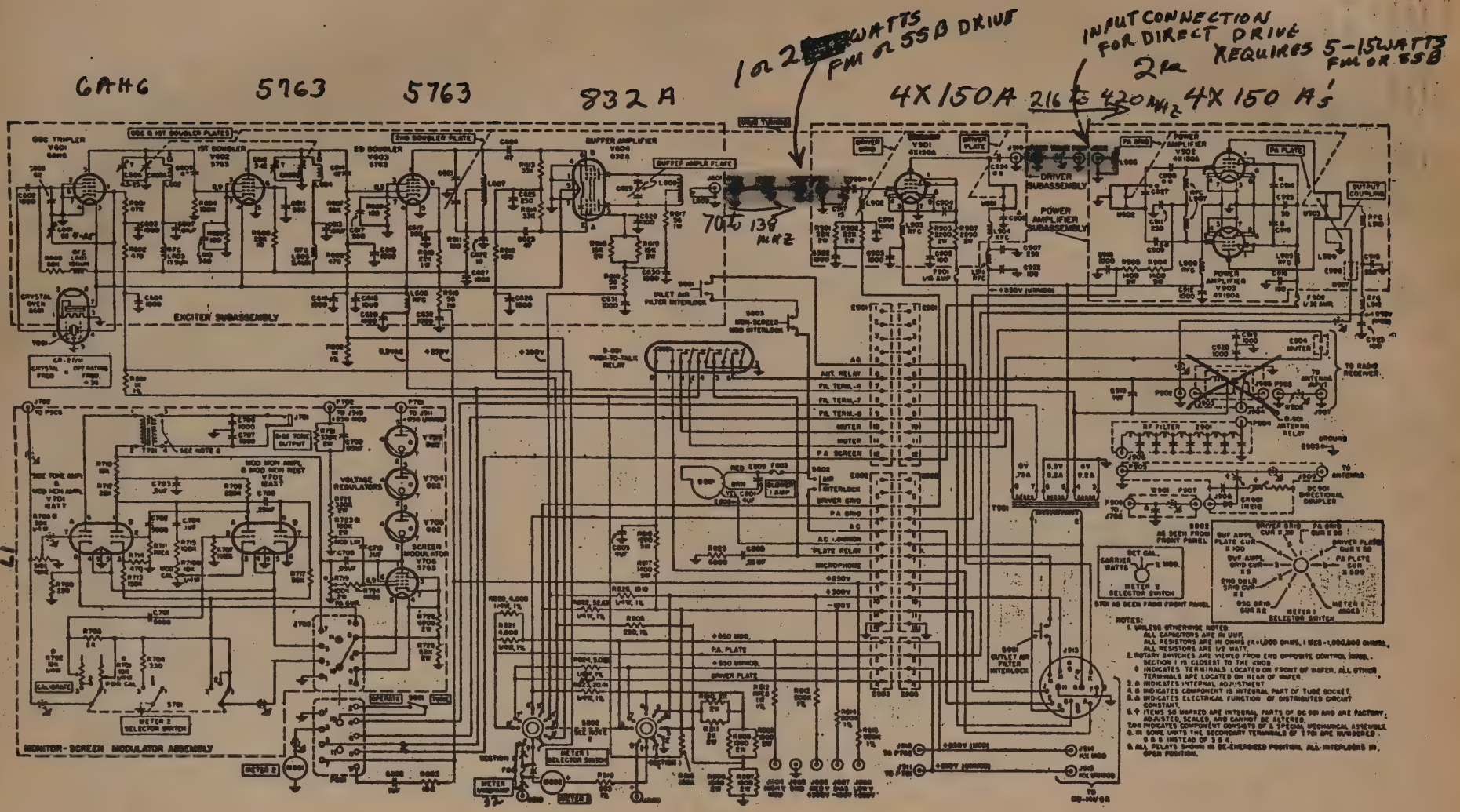
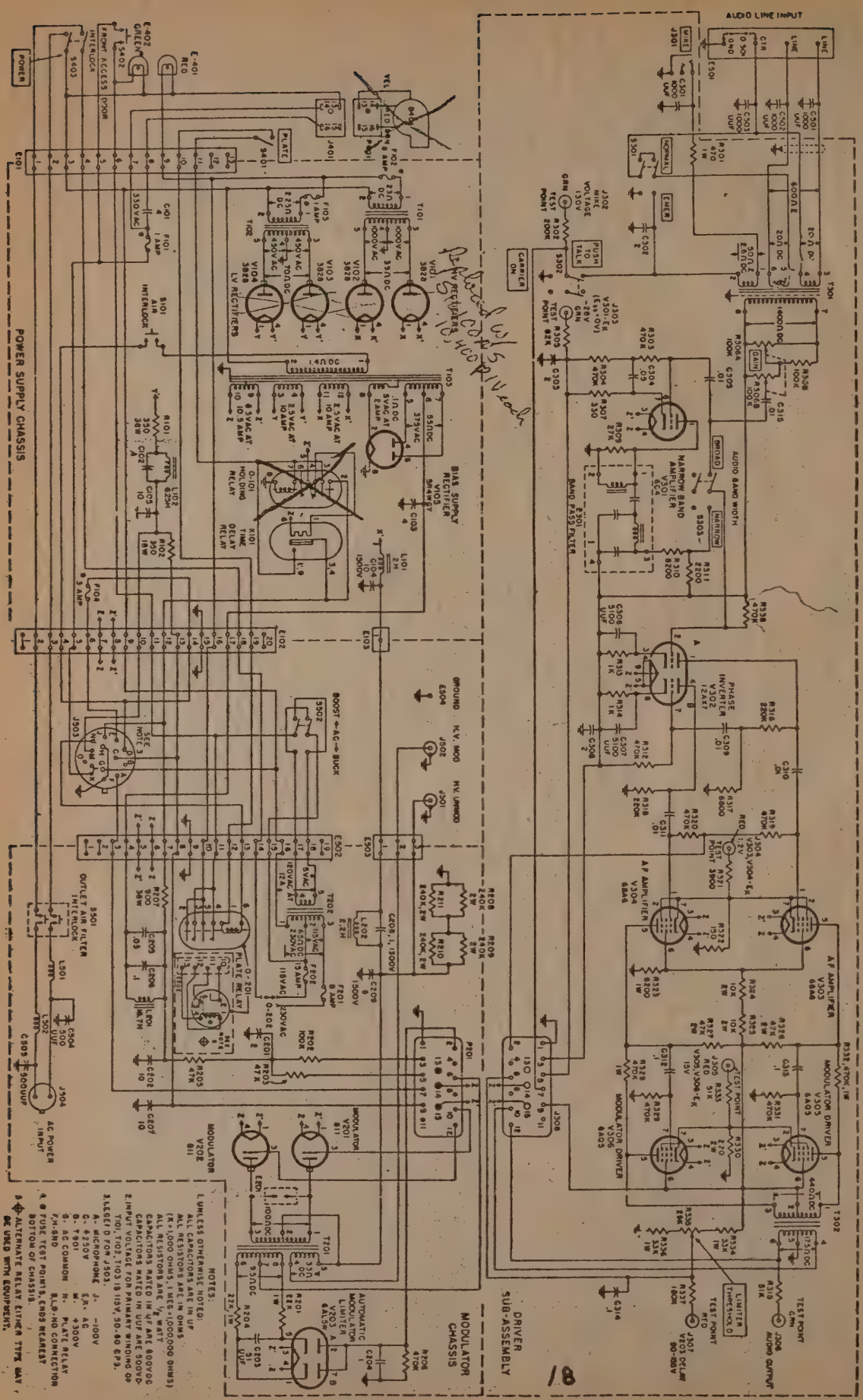


Figure 4-26. Radio Transmitter T-282/GR, Power Amplifier, Simplified Schematic


6AH6
5763
5763
832A
1 or 2 WATTS FM or SSB DRIVE
INPUT CONNECTION FOR DIRECT DRIVE
2m
REQUIRES 5-15 WATTS FM OR SSB
4X150A
216 to 420 MHz
4X150 A's
70 to 138 MHz
EXCITER SUBASSEMBLY
DRIVER SUBASSEMBLY
POWER AMPLIFIER SUBASSEMBLY
MONITOR-SCREEN MODULATOR ASSEMBLY
NOTES:


POWER SUPPLY CHASSIS
MODULATOR CHASSIS
DRIVER SUB-ASSEMBLY
AUDIO LINE INPUT
NOTES:
1. UNLESS OTHERWISE NOTED:
ALL CAPACITORS ARE IN UF
ALL RESISTORS ARE IN OHMS
(K=1,000 OHMS, 1 MEG=1,000,000 OHMS)
ALL RESISTORS ARE 1/2 WATT
CAPACITORS RATED IN UF ARE 600VDC
CAPACITORS RATED IN UUF ARE 500VD
2. INPUT VOLTAGE FOR PRIMARY WINDING OF
T101, T102, T103 IS 115V, 50-60 CPS.
3. LEGEND FOR J503:
A- MICROPHONE J- -100V
C- +250V K- AC
D- T801 M- +300V
S- AC COMMON N- PLATE RELAY
T/H-GND BLD-NO CONNECTION
4. ⊕ FUSE TEST POINTS, GNDS NEAREST
BOTTOM OF CHASSIS.
5. ◈ ALTERNATE RELAY EITHER TYPE MAY
BE USED WITH EQUIPMENT.

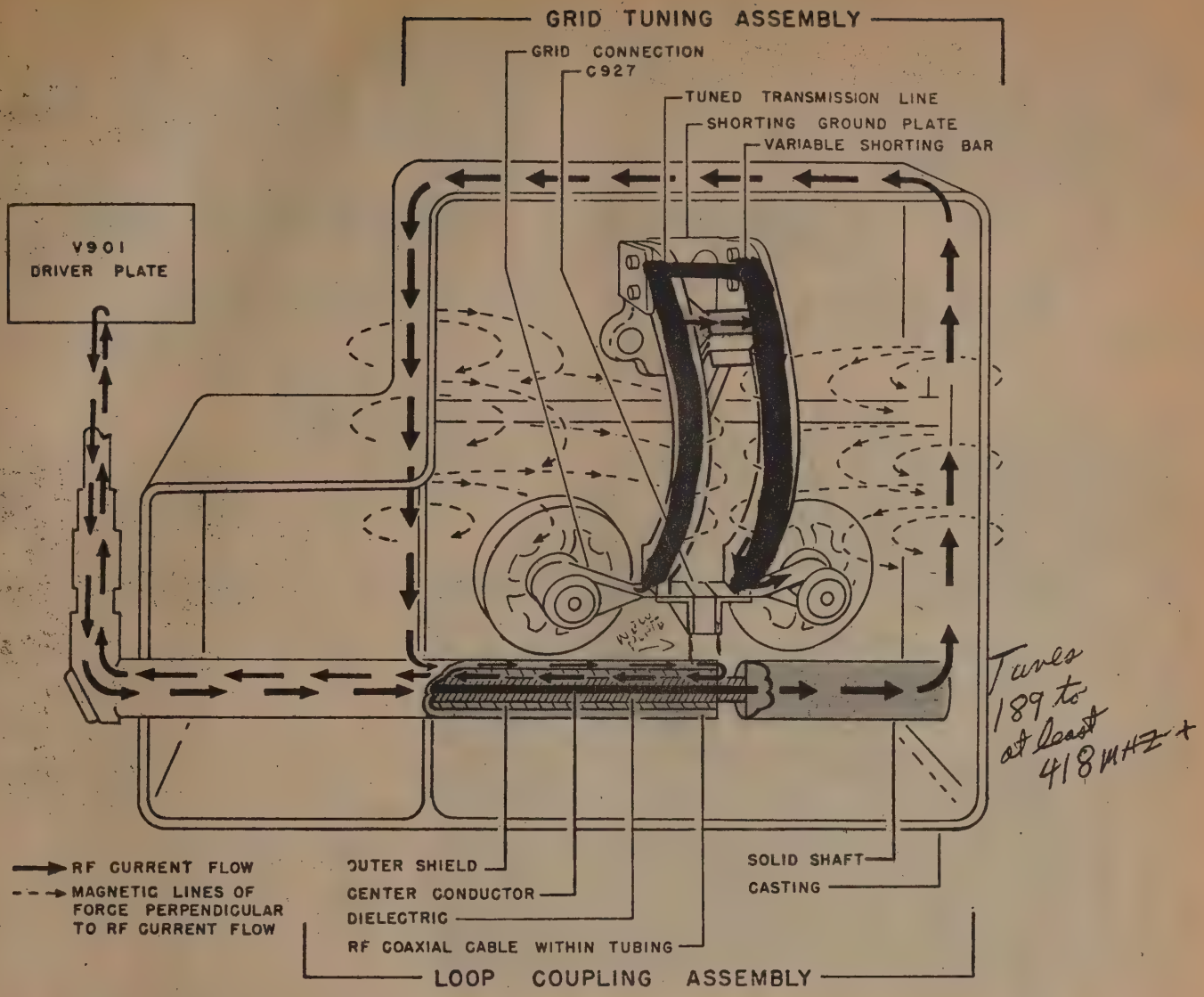


Figure 4-28. Radio Transmitter T-282/GR, Power Amplifier Input Circuit

MODS:
1. Remove the harmonic filter in the output circuit (between final and output connector.
2. For use as an amplifier, simply put your 10 watt exciter output to the grid input of the final amp. For use as a transmitter, your scribe has not tinkered with the multipliers, so your on your own!
3. Turn the freq control full CW (400 Mhz) locate the mechanical stop on the shaft. Apply liberal torque with a pair of large Channel Locks until you can tune well above the normal limit. Observing the final output or grid slider until you reach the practical limit. Now simply tune for max smoke! Mine got 200 watts with no furthur mods, except solid state PS diodes. You can re-build PS, eliminate all previous stages, AM modulator (and a lot of weight) by ripping out everything you don't want to use and get an easy KW. I suggest subbing 4CX250's if you go to higher B+ since TV is a high duty cycle **signal.** That's all there was to get mine going. The blower is generally VERY noisy, so you will probably want to buy a quiet one at the next flea market. Experimenting with a signal generator I was able to tune the final amp to 496 Mhz which was the limit of travel and still have a connection between the tuning lines! The amp seems broadbanded enough to easilly pass any ATV signal. I use subcarrier sound and there is no apparent reduction in subcarrier level without or with the amp. My biggest problem has been finding a suitable TX / RX relay which is low loss (for RX) and can handle the watts (TX).

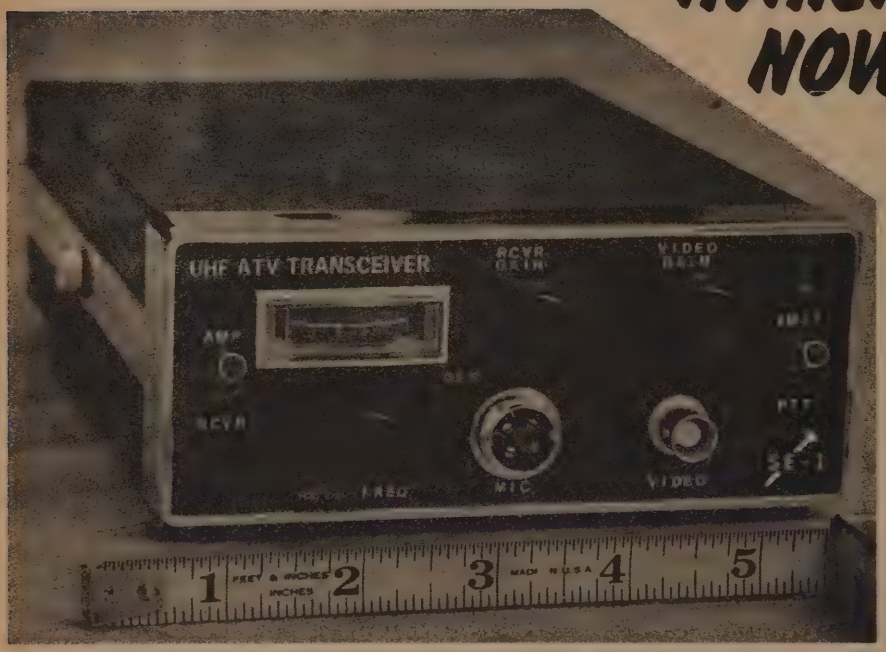
There are at least 2 versions of the T-282 by different manufacturers, both bearing the same nomenclature. The one is a heavy beast, the other is a half heavy beast. The FAA has been removing these from service and several dozen have appeared on the surplus market for around $100. They make dandy units for 220 or 450 Mhz.

NEW!

ANOTHER FIRST FROM:
SCIENCE WORKSHOP
Box 393, Bethpage, N. Y. 11714

COMPACT, MOBILE OR FIXED - ATV TRANSCEIVER!

AVAILABLE NOW!



COMPLETE

Just plug in Camera, Ant. & Mic.

****

Works with any T.V. rcvr.

****

Runs off your 12 volt pwr. supply or car battery.

****

Supplied with pwr. plug & cable, mic. connector & mobile mtg. bracket.

INTRODUCTORY PRICE
ONLY 349.95 + 3.50 SHPG.

TRANSMITTER

- 10 WATTS PEAK VIDEO POWER!
- BANDWIDTH FOR COLOR TV!
- CARRIER OR SUB-CARRIER AUDIO! MOBILE OR FIXED!
- 439.25 MHZ CRYSTAL (XMT.) SUPPLIED!

RECEIVER

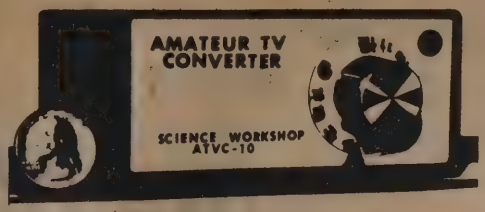
- TUNES 425 MHZ THRU UHF CHANNEL 20!
- 2 TRANSISTOR LO-NOISE PRE-AMP
- 3 TRANSISTOR, VARACTOR UHF CONVERTER! FULL R.F. GAIN CONTROL!

ALL THIS IN A COMPACT 9½" X 5½" X 2½" PACKAGE!

FRONT PANEL CONTROLS:

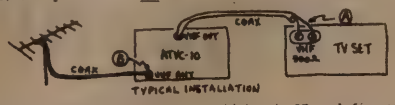
AMP/RCVR sw. AMP. - meter reads xmt. current. **RCVR.** - reads varactor voltage.
RCVR. FREQ. - Rcvr. tuning
VIDEO GAIN - adjuts video level.
MIC. A.F. input (connector supplied).
VIDEO - BNC 75 camera input.
RCVR GAIN/OFF. - R.F. Gain, Pwr. On-Off.
XMIT/PTT SW. - PTT - SW. ON MIC. CONTROLS XMIT/REC.
XMIT - OVERIDES SW. ON MIC.

TUNABLE AMATEUR TV CONVERTER



ATVC-10

By connecting a UHF antenna to the input of the converter, and the output of the converter to the VHF antenna terminals of any TV set, the operator can see what the local hams are doing on a TV.



The circuit consists of a low noise, high gain RF amplifier stage with Varactor tuned input and outputs, an active (transistor) mixer stage with Varactor tuned input, and a Varactor tuned oscillator stage. Uses 3 transistors and 4 Vari-cap diodes. RF gain is adjustable.

The built-in AC power supply uses a transformer for power line isolation and 4 diodes in a full wave bridge. The supply voltage for the 4 tuning Varactors is regulated. The converter tunes electrically (no moving parts) from 420 to 450 MHZ and outputs on CHANNEL # 3.

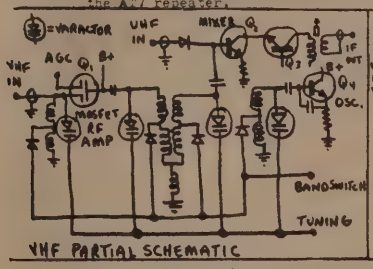
Note: From ARRL Specialized Communications Techniques.

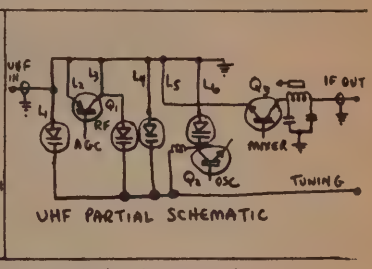
"Tunable converters are preferred over the crystal controlled variety, for several reasons. ATV is normally A. M. with two sidebands, rather than the carrier-and-one-sideband of commercial T.V. For the clearest picture it is helpful to be able to tune off to one side or the other of the ATV carrier, depending on the shape of the receiver i-f Pass-band, and local occupancy of the lower vhf TV channels".

The ATVC-10 comes completely wired & tested & guaranteed for 2 years. It is housed in an attractive 2 tone (walnut & beige) finished aluminum cabinet, only 1 7/8" X 4 1/4" X 4", with Full instructions Only $59.95.

UHF/VHF VARACTOR TUNERS

The two tuners described below tune electrically (no moving parts) from approximately 50 MHZ to 1 GHZ (with a few gaps in-between). They are both HI-GAIN, LO-NOISE, SPACE-AGE-AGC tuners. They were manufactured for one of the leading manufacturers of Solid State Color T.V.'s. They differ radically from conventional tuners since they are VOLTAGE tuned, rather than mechanically tuned. They both have double-tuned R.F. amplifier stages (a dual gate MOSFET in the VHF tuner). These tuners, in addition to their improved gain, noise and selectivity-provide increased tuning range (above and below conventional T.V. tuners) through the use of varicap diode tuning. This makes it practical to use the UHF unit to tune the 420-450 MHZ ham band with no modifications. Similarly, the VHF unit can be made to tune the 6 meter, 2 meter and 220 MHZ ham frequencies. Connecting the UHF unit in place of the conventional one in our TV set here in Bethpage, we were able to pick up the local ATV hams and the ATV repeater.





The frequencies that the tuners were designed to cover in their normal application are:

VHF 54 to 88 MHZ and 174 to 216 MHZ
UHF 470 to 890 MHZ

Varying the Varactor tuning voltages above and below those used for tuning the VHF & UHF TV channels provides the additional coverage into the adjacent ham, public service, etc. frequencies. Isolating the tuning voltage to the oscillator varactor offsets it to produce IF output frequencies other than the 45 MHZ Video IF normally used. We have been able to output at frequencies from 20 to 200 MHZ!

These tuners have been successfully adapted to provide specialized, hi-quality receivers and converters over a wide range of frequencies - as well as in other diversified applications (such as the spectrum analyzer described on the opposite page). Also, as tuner-subbers, remote control tuning (a la Jerrold), mast-head converters (convert 450 MHZ at the antenna and come down with 45 MHZ to eliminate UHF transmission line losses), telemetering receivers, etc. They are supplied with diagrams for typical applications and sold with a MONEY BACK GUARANTEE.

Prices: UHF --$7.95 ea. (2-$15)
VHF --$19.95 ea.
Combination (1ea. UHF/VHF) $24.95

RCA SOLID-STATE VHF POWER AMPLIFIER

Cat.#102
Commercial, mobile 150-170 MHZ, brand new, completely enclosed 9"X 2¼" X2" package. Contains driver & stud mtd. power transistors, metering leads, solid state T-R switch & Lo-pass output filter. 100 MW in, 6-8 Watts out @ 13.8 Volts. Schematic & 2 Meter conversion instructions included. Only $9.95.

Cat.#116 SYLVANIA MODEL 100 CATV-VHF TRUNK AMPLIFIER MODULE.

Specs: 50-270 MHZ 0.2dB, Adjustable gain = 18-31 dB, Adjustable slope =1dB, Power req.= 360 ma. @ 24V. D.C. Size=8¼"X 1¾"X 2 3/4" Has 5 stages of TRW ("windmill" style) R.F. power transistors. Typical noise figure at Chan. 13=9 dB. Covers all VHF-TV channels, 6 & 2 meters, VHF aircraft, public service, commercial F.M., etc. 75 ohm input & output, type "F" connectors. With Schematic, only $9.95.

Cat. #104 PRECISION DIGITAL MEDICAL ELECTRONIC THERMOMETER.

Made for hospital use -cost approx.$300.00 Range from 90.2°F to 106.9°F. Press & release button. Decimal point LED lights. After 35 seconds, warning beep signals temperature will be displayed for 10 seconds. Flashing decimal point indicates low battery, time to recharge. Shuts down automatically before lower voltage can affect accuracy. Contains 11 I.C.'s, 25 transistors, 20 diodes, audible alarm & 4 seven segment PIN-LITE displays. All parts have standard (2N,etc.) numbers. Can be used for it's original purpose or as the basis of many electronic devices. Substitute a carbon monoxide variable resistance sensor for the thermistor probe (data supplied) and tune your car! Operates on 6V. D.C. Complete P.C. board (as is) $6.95, (tested) $9.95. In alum. case, add $2.95. Thermistor probes (with coil cord & plugs) $2.75 ea. Charger base $5.95.

With schematic & instructions for possible modifications.

Cat.#105 AS-IS 12" SOLID STATE T.V. P.C. BOARD

Contains Video & Sound I.F., Sound det. & output, sync, AGC, video, Hor. & Vert. osc. & Amp., H.V. Xfmr, controls, CRT socket etc. W/ schematic. Approx. 8"X 8". Great for ATV'ers, Decoders, etc. Only $9.95

Cat.#106 DIGITAL TV GAME BOARD

Brand new, tested. Contains 95 standard TTL IC's (no house numbers), Xtal (16.128 MHZ) clock generates standard composite video & sync, character generator & counter circuits produce numbers. Sound effects circuits generate ping-pong sounds. No schematic. 5V. 2A. on board regulated supply. Just add filament transformer & paddle controls. Hook-up circuit & instructions supplied. Measures 9" X 17". Only $7.95.

Cat.#107 AUDIO OR R.F. OPERATED RELAY BOARD

Monitor your favorite repeater (or CB channel) while listening to radio (or stereo). Speakers (1 or 2) are switched from radio to your rig when this electronic marvel senses audio from your rig. Holds it as long as there is audio & then returns it to normal operation. Also mutes the radio while transmitting, automatically eliminating the need for switching one unit on and the other off (senses R.F.). Operates on 12V. D.C. Instructions supplied. Brand new, only $4.95

Cat.#108 RCA REGULATED DUAL SUPPLY

Two independent 150 ma. supplies, each adjustable from approx. 6 to 9 volts. Can be combined to supply 12 to 18 volts. Very low ripple. 9 transistors & 7 diodes. Transistor switched "power-on" light. Beautifully built, approx. 11"X5"X2" alum. package. 3 fuses. Instructions supplied, brand new-only $14.95

Cat.#109 NEW ATV BOOK "ATV IN A NUTSHELL"

Everything you need to know to build & operate your own HAM TV station. Over 60 schematics, figures, diagrams & photos. Only $5.00

Cat.#110 NARROW BAND F.M. CERAMIC FILTER SET.

Consists of 1- 10.7 MHZ filter and 1- 455 KHZ Ladder Filter, as used in the E.F. Johnson UHF/VHF Scanner. Supplied with scanner schematic showing how to use them. Also ideal for "advanced spectrum analyser" application, etc. Set, only $9.95

Cat.#111 MAGNOVOX VIDEO I.F. STRIP

State of the art- MOSFET I.F. module. Ideal for building "off-the-air" T.V. monitoring & conversion receivers, etc. when used with our varactor tuners. With schematic, only $19.95 Great for T.V. Decoders!

Cat.#112 ATV/UHF CONVERTER MODULE

New, UHF Varactor tuner, as modified for use in our ATVC-10 Tuneable ATV Converter. Input 420-450 MHZ. Output TV channel #3 (61.25 MHZ). Modified, tested & aligned-with instructions-$19.95 Use as down converter for TV Decoder! (Tunes 420 to 900 MHZ!)

Cat.#113 ATV CONVERTER REGULATED POWER SUPPLY KIT

New. P.C. board and all parts to build regulated supply to power the ATV/UHF Converter Module. Includes trim pots for R.F. Varactor tracking & AGC, AC transformer, 3 terminal regulator, diodes, resistors, capacitors, etc. with instructions: $12.95

Cat.#114 COMBINATION CONVERTER MODULE & REG. PWR. SUPPLY KIT
Consists of Catalog #112 and #113. Only $29.95

NOTE: New I.F. strip for Spectrum Analyzer Kit in the works- old one sold out. Watch A5 for availability. Medium scan ATV strip also coming.

HOW TO ORDER:

Send check or money order - add $1 to orders under $15. or 5% over $15 for shipping. N.Y. residents add tax. COD OK, need street address for UPS. Satisfaction guaranteed. Our products may be returned within 10 days for a full refund (less shipping).

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YOUR NAME

in print, when you send in an article, news item or whatever. The IN basket is empty, unless you want to read a lot of blank pages, send in your projects, articles, news and other items NOW. Deadline for the next issue is Oct. 10th. For the Jan issue, Dec 1. REWARD: full articles earn the author a 1 year renewal of their subscription.

CQ SSTV DE K4TWJ

DAVE INGRAM

Contributing Editor
Amateur Television Magazine

Eastwood Village No. 1201 South
Rt. 11 Box 499
Birmingham, AL 35210

IT'S SSTV DX TIME

The upcoming Fall and Winter seasons should provide some of the best signal propagation conditions we've seen on the 20, 15 and 10 meter bands in many moons. If there has ever been an opportune time to go after those coveted SSTV DX awards, it is now! As you've probably heard, our present sunspot cycle (cycle 21) has already surpassed its predictions and expectations - but the best is yet to come. Cycle 21 isn't expected to "peak" until the mid to late part of 1980! We're presently experiencing sunspot counts above 200 approximately 10 days out of each month, and every time these peaks hit, 10 meters literally blows apart with SSTV DX. Don't let this band fool you. Several times lately we've worked Pacific and South American amateurs around 0330 GMT on 10, and Japan has boomed into the U.S. on 15 meters until 0500 GMT!

The easiest way to keep informed of these super openings is by monitoring WWV bulletins at 18 minutes after each hour. Since many of the presently popular transceivers (Yaesu, Kenwood, etc.) include a 15 mHz WWV receive position, you need only flip the bandswitch there for a few seconds to receive propagation statements and next day forecast. Average DXing conditions are sunspot counts ranging from 140 to 160. When counts reach or exceed 200, the 20, 15 and 10 meter bands are <u>really</u> ready for action. Magnetic storms, which usually last 24 to 36 hours cripple DX conditions on 20, 15 and 10 meters while creating good tropo openings on the UHF bands (great for Fast Scan DXing, eh). Following a magnetic storm, conditions on 20, 15 and 10 meters are usually escalated tremendously. If many SSTVers keep a close eye on propagation conditions and play their cards right, we should soon see a significant rise in the number of SSTV-DXCCers.

One of the best times for SSTV DXing on 20 meters is around 1100 GMT on Saturdays and Sundays. Right as the band begins to open, SSTV views from Japan, Australia, etc., roll into the U.S. with very good clarity. Approximately an hour later, "big gun" DXers start covering every kHz of the band and "SSTV time" is concluded. A number of early morning SSTV DXers don't sit on 14,230 kHz waiting for action, so you might try some different tactics such as telling your DX contacts you also operate SSTV (great subtle hint), or listening to every QSO for an SSTV-familiar call. During a recent morning QSO with WH2ABE on Guam, I mentioned the words Slow Scan in a sentence. Mark returned immediately with "yeah, we have a Robot system here and really enjoy it." Within 30 seconds, we had our video gear operating and swapped 2 pictures each before returning to the DX game 5 minutes later. The frequency (WH2ABE's original frequency) was 14,210 kHz. There was no need QSYing to 14,230 kHz for a quick video exchange.

Meanwhile, on the other side of the world, Ahmed, AP2AD, reports his SSTV gear is now working fairly well but his only Slow Scan views as of late August were from pre-recorded tapes. Ahmed doesn't have much on-the-air time, and his area isn't always open to the U.S. Maybe situations will soon change in his favor. Next time you contact a station in Pakistan, you might ask him to relay SSTV 73's to Ahmed. Who knows - someday later AP2AD might give you an on-the-air call asking for an SSTV contact! DXing and SSTV operating are great fun, and they can be mixed quite easily. You're not limiting yourself to only half this action are you?

Tom Christian, VR6TC, is still quite active on 21,350 kHz around 2330 GMT Tuesdays. If you haven't swapped SSTV views with Tom, give it a try. Please remember to let Tom conduct any official Island business before diverting his thoughts. O.K.?

AUTO BEACON FOR SSTV

Mike, WBØQCD, of Iowa relates that he's having very good luck "fishing out" SSTV contacts on 10 meters through the use of a homebrew auto-CQer. Mike uses a pre-recorded and specific interval-time tape which works as follows. The tape employs 5-8 second "CQ SSTV" video transmissions followed by one minute of silence, 5 more video CQ's, another minute of silence, etc. This tape is used to feed his VOX controlled SSB transceiver, thus automatically switching it from transmit to receive each minute. Mike can then add an audio I.D. and listen for calls or let the CQ tape "take over" once again. Mike reports that between June and August, he conducted 104 SSTV contacts on 10 meters using this technique. Next time you're wondering what's happening on 10, you might give a listen for WBØQCD's "beacon". Although he didn't pass along his usually desired frequency, we're fairly sure it's within a couple kHz of 28,680.

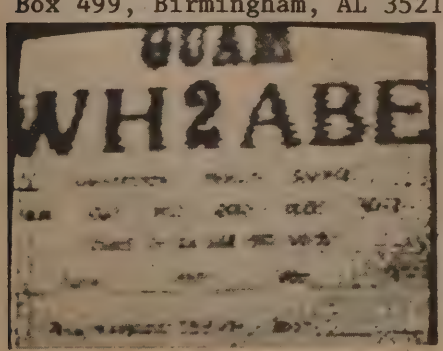
UOSAT PROGRESS

The University of Surrey "Amateur satellite with SSTV" project is progressing quite well at this time. In fact, the first-ever sketch of the spacecraft is included in this issue. As the situation presently stands, SSTV cloud cover pictures will be transmitted on FM in the lower portion of 2 meters. A voice synthesizer will be included on this low orbit (approximately 700 miles) satellite, however I haven't heard if it will be used todescribe SSTV views! Approximate launch time of the satellite is late 1980. More details later.

W1AW and A.R.R.L

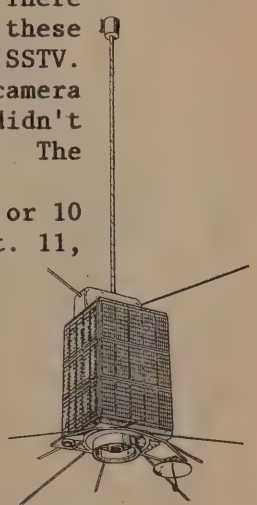
The XYL, WB4OEE, and I visited League Headquarters during early September (during midst of Hurricane David!), and were quite impressed. Activities are handled in a true business manner and the building's new addition on the rear wing provides room for such in-house functions as DX QSL Bureau, a large Conference Room, QST layout, etc. The W1AW building is approximately 200 feet in front of the League building, and it is surrounded by antennas. There are stacked 4 element monobanders for 20, a 3 element beam for 40, a 4 element yagi for 10, plus dipoles for 80 and 40 - and a rhombic which can be used on any band 160 through 10. There are 3 communications centers which may be used by visitors, one of these leans toward SSB, one toward RTTY and CW and the third leans toward SSTV. A Robot 400 system, complete with 10 inch monitor and Fast Scan camera compliment this setup which uses Collins gear. Unfortunately, we didn't have time to operate, but you probably were at work then anyway. The time was 1:00 to 3:00 p.m. Friday afternoon.

That's it for this time. We'll be "looking" for you on 20, 15 or 10 SSTV. 73, Dave Ingram, K4TWJ, Eastwood Village #1201 SO., Rt. 11, Box 499, Birmingham, AL 35210.



Direct Off-The-Air SSTV from Mark, WH2ABE, In Guam. Complete story of this QSO in column.

SSTV view of WH2ABE, Mark's wife as received among early morning DX QRM on 20 meters.



This is the first sketch of the upcoming UOSAT Amateur Satellite which will include SSTV capabilities. SSTV camera is centered in bottom section of spacecraft. 10GHZ dish is on right, with 2 meter antennas on bottom. 10 meter whip atop satellite. Solar cells cover exterior 09 satellite.

signal with many homes via a length of coaxial cable. A 'cooperative' could be formed, for example, into which all involved participants would pay-in a sum of money to be utilized in building the receive terminal. As long as you keep the participants in such a project below 50 'homes' you have no special FCC problems. Beyond 50 homes so connected the FCC considers your operation to be a cable television system. All of which says once you reach 'that plateau' you begin to have to observe certain other (often complicated) rules of the FCC.

If you intend to connect another home (or homes) to your system, plan on having to pay more for the use-rights to the program services from the satellite program relay suppliers. They charge on a 'so-much-per-home' basis.

Could you install such a system in a trailer park, apartment complex, motel or hotel? The answer is yes, but there are special FCC legal requirements beyond the scope of this phamplet to be considered in this situation.

The $64 question. Are all people engaging in backyard terminal reception going through one of these procedures? The honest answer is no, they are not. Most are simply installing their terminals and watching the programs. However as the scope of this activity grows it is reasonable to assume that the FCC and/or program rights owners will eventually become alarmed at this practice. And they have both civil and criminal remedies under the law should they care to prosecute individuals not following the formats suggested here.

Each individual involving him or herself in this activity will have to make their own judgement in this area.

THE TERMINAL AND THE EQUIPMENT

What options does a person have for the equipment required? It turns out that for the present there are more 'high end' options than low end options.

All development of satellite terminal equipment has been directed at the fairly complex and not inexpensive 'CATV' or 'commercial' terminal area. When the first CATV system installed the first CATV receive terminal the cost was in the $100,000 (plus) region. This involved a relatively large 'dish' antenna (so-called 10 meter size which is roughly 33 feet across). Even at that price, the only prior experience with satellite terminals made this price seem low. Prior to CATV use of satellites, terminals sold installed for $250,000 up each to large international communication corporations.

In 1976 the FCC approved use by CATV systems of 'smaller' antenna sizes; in the interim it had been proven that the big ten meter dish antennas were not required to deliver 'quality' signals to cable subscribers. The FCC now routinely grants CATV systems licenses for terminals utilizing antennas down to 15 feet in diameter and under special circumstances down to 12 feet in diameter.

Obviously as the antenna becomes smaller and smaller, the signal 'captured' or received from the satellite(s) becomes lower and lower. How small can you go and still receive a high quality picture?

This is a function of the 'satellite footprint signal level' (see page 6 in this phamplet) in your area. As a rule of thumb:

Satellite TV Handbook

1) If you are located in a (as shown on the EIRP map for the proper satellite) 35/36/37 dBw 'contour' region you can, with a proper set of electronics (LNA and receiver) receive perfect-quality pictures with an antenna only ten feet in diameter.

If, again with the proper electronics, you are in a 33-34 dBw 'contour' on the EIRP map, it will take a 15 foot diameter antenna. In the 31-32 dBw contour it will take a 20 foot antenna.

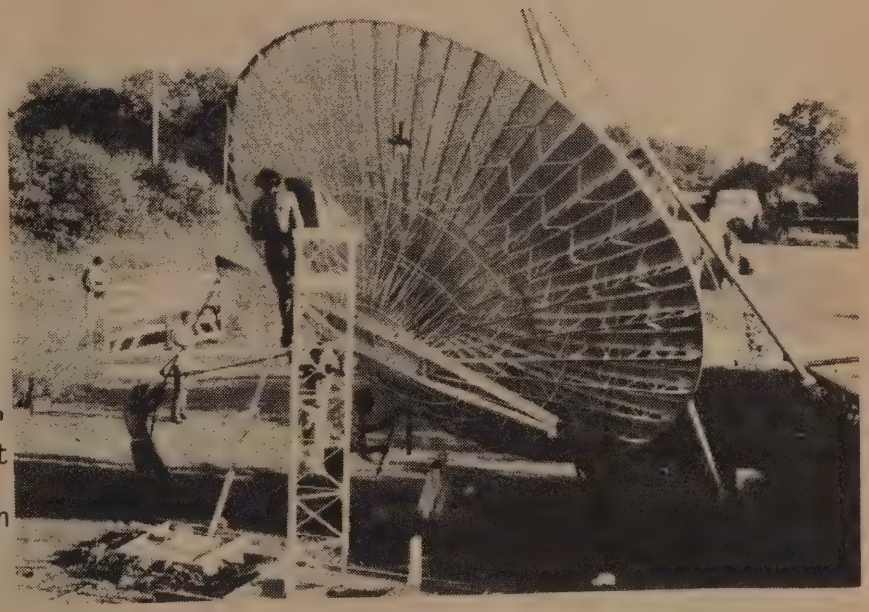
Respectively:

10 foot = 3 meter diameter
15 foot = 4.5 meter diameter
20 foot = 6 meter diameter

What if you just want perfect-plus pictures from all satellites? Probably the 6 meter (20 foot) size is your best overall choice. There is no such thing as 'too big' an antenna; the 'extra signal' provided by a larger-than-required antenna won't generally show up in your picture quality (i.e. 'perfect is perfect' and you cannot get any better!) but the larger antenna will give you some 'margin' for whatever might age (i.e. get less effective) in the total system as time goes on.

What about smaller antennas; say 8 foot or 6 foot?

On the front cover of this phamplet is the author's six foot diameter antenna, (with for size reference, his 7 year old daughter). Obviously such an antenna if it works adequately is far superior (in cost and 'appearance') to a 'big' twenty foot antenna (see to the right).



A TURN-KEY INSTALLATION—commercial companies, largely involved in design and installation of 'professional terminals' for CATV systems can be engaged to come to your location and make complete installation.

In a 36-37 dBw 'contour' area the 6 foot antenna will, with the 'best' electronics available today produce 'almost' perfect pictures. There are just a few 'dancing' black and white (noise) dots in the picture with this size antenna in the 36-37 dBw contour areas.

What about an 8 foot antenna? In 36-37 dBw contour regions it is just enough better to totally clean up the picture(i.e. make it perfect) as long as you continue to use the 'best' (i.e. most expensive) electronic equipment available today.

There is a 'trade off' here; antenna size for electronic equipment pricing. The bigger the antenna, the less costly the electronics required. What all of this says

is that where (as an example) a ten foot antenna (price range $2,200) and $4200 in electronics might produce a perfect picture, an 8 foot antenna (price range $1200) and more expensive electronics ($6000 range) would also do the same job. But when you are wanting to receive weaker signal level transmissions (such as the Canadian ANIK satellite which concentrates its transmissions in Canada) there is no substitute for a larger size antenna.

The least complicated method of station installation is the turnkey approach. This means you contract with some firm to do it all, and 'turn over to you' the (ceremonial) 'key' to the installation after it is completed. Your only obligation is to pay them as agreed.

Most turnkey installations are top dollar installations. The turnkey supplier expects to make a profit on every part he handles and for this reason typically you pay more for each part (the antenna, the receiver, the LNA, etc.) by this approach than by any other approach. However you have the piece of mind of not having to get involved yourself, and, in knowing that they will do the job to your satisfaction (or, assumedly, you won't pay them!). A listing of some such firms appears at the end of this section. A pre-warning however: anticipate paying $18,000 to $22,000 for a one receiver installation if you go this way, and select a 4.5 to 6 meter antenna. For a 3 meter (ten foot) antenna the pricing should be closer to $12,000 to $14,000. As in all purchases it pays to shop around.

Then there is the do-it-yourself approach where you acquire, on the open market, the bits and pieces required and assemble them yourself. This is probably the most cost effective approach available today provided you are of average intelligence and have no aversion to working with typical hand tools and concrete.

This involves the following:

1) Determining the proper location for the antenna and locating its base so that it will properly 'track' the satellite orbit 'belt' (requires elementary geometry and perhaps use of surveyor's transit).

2) Digging appropriate holes for 2-5 yards on concrete, setting pre-constructed base into holes and pouring concrete.

3) Assembling antenna (from drawings), hoisting it onto mount (may require temporary service of auto wrecker with winch or local sign company 'bucket' truck).

4) Placing LNA on antenna and connecting up proper cables (again, from drawings).

5) 'Running' the coaxial cable from the LNA/

DOING SOME YOURSELF—involves preparing foundation(s) for terminal, assembly of antenna parts, running (installing) cables and connecting equipment up; as well as 'locating birds' after installation. Thousands of dollars can be saved this way.

antenna into your home/building where the receiver is located.

6) Running a 'power line' from the receiver back out to the LNA to power this unit (typically a weatherproof cable will do since this is a relatively low DC voltage).

7) Connecting the cable to the receiver (most cable is ordered cut to the proper -pre measured - length with connectors/fittings already in place).

8) Connecting the output of the satellite receiver to the input of your TV monitor, or TV modulator (see page 8 in this phamplet).

9) And if you are using a TV modulator, connecting that to your TV receiver.

This is the only real assembly work. The only other thing you must do is to 'site' the antenna in on the satellite. This involves elementary geometry once again and will be discussed shortly under 'Satellite Antennas'.

Finally there is the 'construct-it-yourself' approach. Here you are not collecting previously constructed units (such as the LNA, receiver, etc.) but rather you are assembling these devices from component parts (resistors, capacitors, transistors, etc.). This is only for the highly skilled and even at that it requires specialized (microwave frequency range) test equipment and a 'willingness' to part with as much as $325. for a single component part! (Some of the parts used in satellite television receivers are produced in very small quanities and their per-part-cost is still very high.) For this type of person the best recommendation we can make is a subscription to CATJ magazine where circuits on terminals appear from time to time. At the present time there is no single source-book for such 'schematic diagrams'. Our best advise here is to not attempt such a project unless:

1) You are in no hurry at all
2) You have perhaps 1,000 hours to dedicate to the project
3) You are willing, before you are done, to spend at least $1,500 for all of the 'raw' parts required to construct the a) antenna, b) LNA and c) receiver.

Listing Of Turnkey Satellite Terminal Suppliers

1) Farinon Electric, 1691 Bayport Rd., San Carlos, Ca. 94070 415-592-4120 (Jim Hurd)
2) Gardiner Communications Corp., 2000 S. Post Oak Rd., Suite 1490, Houston, Tx. 77056 713-961-7348 (Wally Briscoe)
3) Hughes Microwave Communications Products, 3060 W. Lomita Blvd., Torrance, Ca. 90505 213-534-2146
4) Microdyne Corporation, Box 1527, Rockville, Md. 20850 301-762-8500 (Dave Alvarez)
5) Microwave Associates, Inc., 63 Third Av, Burlington,Ma. 01803 617-272-3100 (J. Duke Brown)
6) Prodelin, Inc., 1350 Duane Ave., Santa Clara, Ca. 95050 408-244-4720
7) RMS/Harris, Inc., P.O. Box 1277, Kilgore, Tx. 75662 214-984-0555
8) SATCO, Suite 211, 217 S. Stemons, Lewisville, Tx. 75067 214-436-1571
9) Scientific Atlanta, Inc., 3845 Pleasantdale Rd., Atlanta, Ga. 30340 404-449-2000
10) USTC, P.O. Drawer 'S'. Afton, Okla. 74331 918-257-4257 (Danny Weathers)

And, in Canada

11) Northern Satellite Systems, Ltd., # 203, 4103 4th Ave., Whitehorse, Yukon Y1A 1H6 403-667-4247 (Rod Wheeler)

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THE ANTENNA

As you have surmised, the antenna is a very important part of the system. Antennas are fabricated from two basic materials; either metal (aluminum with some steel), or fiberglass. The fiberglass antennas have small particles of ground up metal ('dust) impregnated in the fiberglass surface to insure a 'reflective surface' for the antenna.

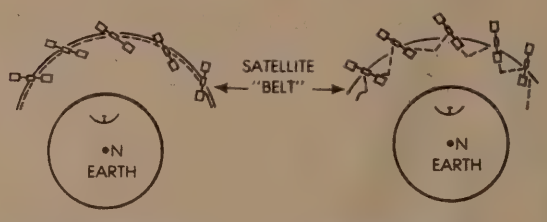
Bigger is better (i.e. more sensitivity) and bigger is more expensive. Bigger is also more difficult to install since bulk and weight increase. Metal weighs more than fiberglass (of equivilent antenna size) but not as much more as you might suspect. A 'big' twenty foot (six meter) antenna weighs in at around 3,000 pounds. A 'small' six foot fiberglass antenna weighs under 100 pounds.

Antennas are described by their 'tracking mechanism' as much as anything else. This is the operation that allows you to 'swing' the antenna from satellite to satellite. There are two primary types of mounts:

1) Polar mount - a mechanical antenna mounting system that allows you to align the 'axis' of the antenna with true-north (and south) so that the antenna surface follows an arc-curve left and right of due-south. A polar mount antenna, if properly installed on the true north-south line, is the easiest and quickest method of moving from one satellite to another. To change satellites the antenna simply swings left (east) or right (west) some pre-determined amount and the satellite is accessed.

2) Az-El mount - a less complex mounting system than polar but one that requires

SATELLITE RECEIVE ANTENNA MOUNTS



POLAR MOUNT—TRACKS EVENLY LEFT TO RIGHT (OR RIGHT TO LEFT) IN "AZIMUTH" THRU SATELLITE "BELT"

AZ-EL MOUNT—TRACKS ACROSS "BELT" IN STEPS; REQUIRES SEPARATE ADJUSTMENTS FOR AZIMUTH (LEFT/RIGHT) AND ELEVATION (UP AND DOWN)

TWO TYPES OF ANTENNA MOUNTS—are available. 'Polar Mount' when properly installed will 'track' or maintain elevation setting through total 'satellite arc'. Azimuth over elevation (Az-El) mount requires separate (hand) adjustments of first one parameter (elevation) and then another (azimuth) to track from 'bird to bird'.

separate adjustments for the left/right (azimuth) and up/down (elevation) settings for satellite to satellite movements.

Some people have developed 'automatic' or 'remote controlled' azimuth/elevation adjustment systems to allow them to move the antenna from one satellite to another satellite from an inside location. There are no economical commercially available

systems to do this currently available; systems that are available typically cost as much or more than the antenna itself.

If one satellite (such as RCA SATCOM F1 which has so many channels on it) is all that you require, the antenna cost can be lowered by 15-20% in some instances (Prodelin for example) by specifying a 'fixed mount'. This type of mount could be moved from one 'bird' to another but it would require several hours time and in some instances the concrete work would have to be refashioned to allow this to be done.

A fixed mount for the 6-8-10 foot size antennas can be arranged so that the mounting structure is a single large diameter (typically 4.5 inch) pipe in concrete. This type of mount (see front cover of this phamplet) will hold the smaller size antennas, and by loosening the bolts that hold the antenna on the pipe mount (being sure you block the antenna off so it does not slide down!) the antenna can then be re-adjusted left or right, and up and down, by loosening and tightening several bolts. This is a 'poor man's approach' to the Az-El mount system. The six foot antenna on the front cover, incidentally, has a hinged at the bottom pipe-mount. By having a hinge at the bottom of the 4.5 inch pipe, the antenna will 'fold over' to ground level where it can be worked on easily. Two average size adults are required to 'push' the folded over antenna back up to the vertical position.

Antenna suppliers follow:

1) Andrew Corporation, 10500 W. 153rd Street, Orland Park, Ill. 60462 312-349-3300 (4.5 and 10 meter metal antennas)
2) Anixter Mark, 5439 W. Fargo Ave., Skokie, Ill. 60076 312-675-1500 (Ed Lemarre) (5.0 meter metal, 3 meter metal)
3) Gardiner Communications Corp., 2000 S. Post Oak Rd., Suite 1490, Houston, Tx. 77056 713-961-7348 (Wally Briscoe) (5 meter fiberglass)
4) Microdyne Corporation, Box 1527, Rockville, Md. 20850 301-762-8500 (David Alvarez) (5 meter fiberglass)
5) Prodelin, Inc., 1350 Duane Avenue, Santa Clara, Ca. 95050 408-244-4720 (6,8,10, 12,15 foot fiberglass)
6) PARAFRAME, 611 Farmview Rd., Park Forest South, Ill. 60466 (Jim Vines) (10,12, 15 foot assemble and finish yourself home terminal antennas designed especially for private terminal applications)
7) Scientific Atlanta, Inc., 3845 Pleasantdale Rd., Atlanta, Ga. 30340 404-449-2000 (5 and 10 meter metal)
8) USTC, P.O. Drawer 'S', Afton, Ok. 74331 918-257-4257 (Danny Weathers) (13 foot metal and 20 foot metal)
   And, in Canada
9) Northern Satellite Systems, Ltd., # 203, 4103 4th Ave., Whitehorse, Yukon Y1A 1H6 403-667-4247 (Rod Wheeler) (15 foot fiberglass)

THE LOW NOISE AMPLIFIER

The LNA or low noise amplifier is the most important part of the terminal simply because it really establishes the sensitivity for all of the receiving system. It is also the most 'space-age-exotic' portion of the installation.

The LNA does two things: One, it contributes much needed signal gain or amplification right at the antenna, before the weak satellite signals have an opportunity to get any weaker by traveling through the coaxial cable to your receiver.

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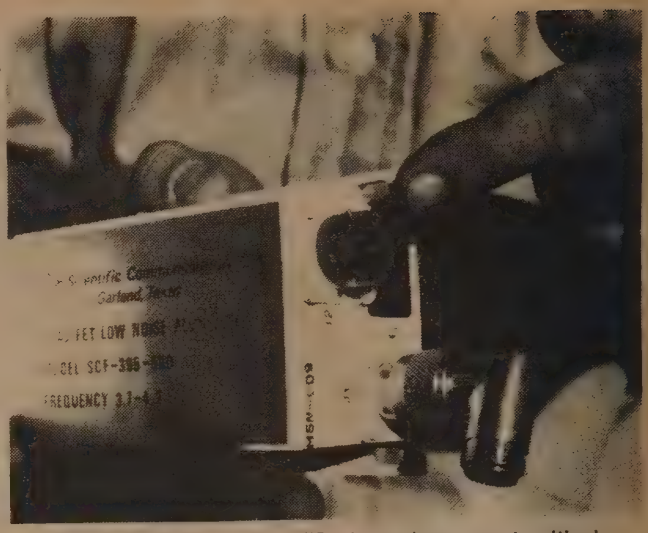

LNA/LOW NOISE AMPLIFIER—is perhaps most critical portion of system. Unit mounts at antenna to pre-amplify or 'boost' satellite signals before they begin trip to your actual receiver through inter-connecting 'coaxial' cable. LNA devices remain expensive portion of installation ($1500-$2000 each).

And two, it plays an important part in determining picture 'quality' by not contributing additional noise (i.e. snow or picture imperfections). There are two important measurement criteria for these LNA units:

1) The gain (i.e. how much it amplifies the signal), and,

2) The noise factor (i.e. how little noise it contributes to the picture you see).

More gain is better while less noise is better. Ideally you would want an amplifier with lots of gain and very little (as low as practical) noise.

More gain means more 'transistor' stages and each stage costs money. In terms of what is acceptable, "50 dB of gain" seems to be a pleateau which most system terminal installers strive for.

Less noise means high quality transistors. In fact, the transistors used in some portions of the LNA are so special that they cost the LNA manufacturer as much as $325 each (!). If this suggests the LNA costs a fair piece of change, you read the message correctly. In fact, the LNA ranges from around $1,500 for a unit suitable for big 20 foot antennas (in 35-36-37 dBw 'contours') to around $5,000 for a unit suitable for six foot dishes in 35-36 dBw contours.

Fortunately for most systems a unit in the $1,600 to $2,000 price range is adequate although the better the unit the better the pictures (up to perfect pictures). The choice of the LNA is the third portion of the equation "EIRP = antenna size (gain) + LNA noise factor". In other words, not only must you select an antenna (size) for your EIRP or contour area, but you must also select an LNA based upon the same criteria. At the risk of over-simplifying the procedure:

Contour	Antenna Size	LNA
36/37 dBw	20 foot	250 K
	15 foot	170 K
	12/13 foot	150 K
	10 foot	120 K
	8 foot	100 K
34/35 dBw	20 foot	170 K
	15 foot	150 K
	12/13 foot	120 K
	10 foot	100 K
32/33 dBw	20 foot	150 K

HOSTILE ENVIRONMENT—the LNA device, mounted at 'antenna focal point' is exposed to all weather elements and must be properly installed and protected against moisture or extreme shock.

15 foot	120 K
12/13 foot	100 K

Now what does all of that mean? An LNA is 'rated' by its noise contribution. This is done mathematically by referencing the amount of noise it contributes against a 'no-noise' reference source. Such a source has 0 degrees of noise K or Kelvin (this is a scientific temperature scale). 0 degrees K noise is no noise.

With today's technology, the very best transistor amplifier for our particular microwave frequency band (the band used for relay of TV signals from the satellite to the ground) has a noise factor or noise temperature of 100 degrees K or Kelvin. Which is another way of saying that when technology improves and (say) 60 degree K LNA devices are available we can then combine these (not yet available) lower noise amplifiers with smaller and smaller (dish) antennas and still produce 'perfect satellite pictures'.

The LNA must be powered. There are two options available; run it on 110 VAC (that is what your household current is), or run it on a lower DC (direct current) voltage. Most satellite receivers have a DC voltage 'jack' on the back where you can plug in a simple two wire line (such as weatherproofed outdoor extension cords normally used for AC) and run that voltage line out to the LNA where it plugs in on a marked plug. Of the two choices, the DC approach is far safer and better. Running AC out of doors, where rain and moisture can get into it, is a dangerous procedure at best.

The LNA mounts at a special (designated) spot on the antenna. With some antenna designs (called 'prime focus') this spot is at the so-called 'focal point' of the dish antenna; the location where all of the dish collected satellite signal energy comes together after being focused to that spot by the parabolic shaped dish reflector (see photo on page 33). In other antenna designs the LNA mounts behind the dish in a special hole created for it in the center of the dish surface. When the LNA mounts at the 'prime focus' or front position, it is subjected to all that Mother Nature can create. Ice, snow and heavy rains will fall on it and it must be protected against moisture ingress (i.e. moisture leaking inside). This is done by following the instructions of the LNA manufacturer in installing it. When it is mounted behind the dish, there is a certain amount of protection for the LNA from the dish surface itself. However it must still be installed properly to protect it against moisture.

There are very few qualified manufacturers of LNA devices at the present time.

1) Avantek, Inc., 3175 Bowers Ave., Santa Clara, Ca. 95051 408-249-0700 (Robert C. Mullaley)
2) Real World Systems, 128 Cross House Rd., Grenoside, S30 3RX, Sheffield, England (Steve J. Birkill)
3) Scientific Communications, Inc., 3425 Kingsley Rd., Garland, Tx. 75041 214-271-3685 (Tom Humphries)

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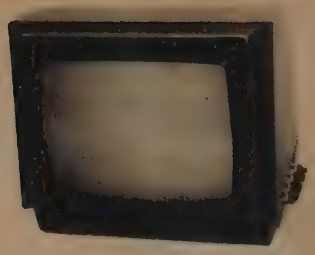

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#9308 - Here is a honey of a small B&W video monitor. A most attractive metal cabinet in simulated wood finish with a 12" diagonal measurement CRT. Controls on side of Contrast, Horiz. Hold, Vertical Hold, On/Off & Brightness. Std. SO239 Coax with 75 ohm termination. Measures only 14"W 12"H 11"D max. This monitor would be excellent for all fast or slow scan TV work, security & surveillance, computer readout, etc. Full transformer isolated power supply for 115/230V AC input. Made by Elston Elec. Corp. Model DM-10. Completely solid state except CRT. Std. shpg. wt. 35 lbs. W/sch. $99.95

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WHY ARE THESE TWO ATV'ERS GRINNING?? (left KA9BST, right W9JIM) Caption this photo and win a 1 year renewal or subscription for the best answer. Entry must be received before Nov. 1, 1979. (Photo taken at midwest ATV club meeting, Bloomington, IN.

ATV COORDINATION

By Tom O'Hara W6ORG

Another name for this article could be the Case for .43. 146.43 is the national ATV 2 meter FM coordinating freq as determined at the 1978 ARRL National Convention in San Diego. There are many reasons for using two meters or another band for fast scan ATV and a few will be outlined here.

It has often been the case that the first ones on in any given area probably knew each other from QSOs on another band and just decided to try getting on video. Or like me someone gave a demo at a radio club or at a convention. I soon found that UHF and video required some definite construction practices and operating procedures much different than just hearing the world with a general coverage receiver and a clip lead to the bed springs. It took many telephone calls to the few people in the area to get them to come on the air and get their beams pointed at me let alone to find out how to convert a UHF tuner and that the UHF loop on the back of the set wasn't enough. This got to be quite a hassle when there were about 5 of us. We found that most of us had some old SCR 522s or ARC 3s so we decided to get some rocks on the same 2 meter freq.

Other hams on two meters heard our discussing the pictures and broke in to ask questions. Before we knew it we had a club going with a roster of 110 members all over Southern California. We put the word out through radio clubs and ARRL scms of where to find us. Not too surprising, there were many other groups just like us such that once we knew where to point our beams and exchange other information, our DX went from 5 miles to over 100 on occasion. Many nights I can remember seeing some sync bars coming from somewhere but not quite able to find out who it was and let them know they were getting in. The more new stations you work the more fun it is. But unless they know where you are and what freq you monitor the chances of your beam pointing at their beam at the right time is rare. But 10 or 25 watts omni on a squelched 2 meter channel can put you in touch with another atver or even one interested in finding out about it rather than rotating the beam and calling CQ.

Occasionally a new station comes on who does not know the local freq so the first thing we do if we can get him back on video is to do like in the picture from Jim WA6YIE. Jim connects the video out of his Radio Shack TRS-80 mini computer through a 180 ohm resistor to his transmitter. He then keys up a large letter scrolling program such as the one shown to let the new station know where to talk back to him. Jim also plays other games on the air such as monopoly from the computer.

There are some computers at ATV repeater sites such that interactive games such as pong can be played. One station transmitts a variable tone on the sound subcarrier and the other station puts the tone on two meters. The tone freq determines the position of the paddle.

Two meters can give a indication of possible DX openings. Don't let line of sight graphs and calculations stop you from going after some DX. The mathematical variables are somewhat simplistic and don't take into consideration temperature inversion ducting, reflections and refractions, foliage densities, and all the conditions that hams like to brag about when they attribute it to their rig or operating methods. Generally a station running 10 watts on sync tips with a 13 db antenna can work reliably over a 15 mile path. Here in southern California the temperature inversion is in half the time especially about sun down. This is the only time that a smoggie day is a good day. The off the air picture of Diane (Minnie Mouse) WA6MVD is over a 46 mile path over two ranges of hills 2000 ft high. Two meters enabled us to immediately describe signal strength as we rotated antennas. We found that bounce against a range of hills about 15 degrees off direct sometimes gave a better picture. Others hearing the exchange on 2 meters joined in and she worked stations twice as far as mine that night.

When there are many stations on, 2 meters makes a great net channel to allow everybody an orderly contact. It also cuts off the long winded. The off the air picture of the hill with WB6BAPs call superimposed is from this last field day. Ernie went over to Catalina Island (26 miles across the sea) and at the 1700 ft level worked stations from Santa Barbara (105 mi) to San Diego (90 mi). Unfortunately the night fog got his transmitter and he only made contacts on Saturday. By using 146.43 to determine who was going to transmit next everybody got a chance at an ATV contact.

That weekend and the following weekend we loaded up our TC-1 and GP-5 color camera into a Piper Cherokee Six and buzzed the beach area. K6JPO and WB6BJC had video in one of the race officials power boats for the Marina Del Rey to San Diego sailboat race. They directed us to the lead ships to make a low pass and transmit back to them to video tape. The picture shown is flying over the Long Beach harbor area. The low passes didn't come out so good as the film in the polaroid and the speed of the camera isn't fast enough to make more than a blur. It was quite a sight though seeing over 300 sailboats going past Marineland. Again two meters helped us direct our ATV pictures. The same type of thing can be done for other public service events such as parades, or even CAP searches.

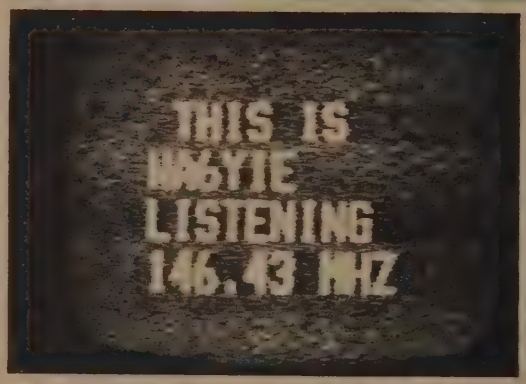
If you are contemplating putting up a repeater, checking out the site before actually dedicating the gear is important. I suggest getting those who you figure are farthest away or down in a hole to come on and make tests, with you at the site with a portable rig...both two meters and ATV. If you are in an area with

lots of trees and foliage your actual antenna heigth is not the distance of the tower above ground but probably closer to the distance from the antenna to the top of the surrounding trees. Trees really absorb the 450 RF. There is a station 15 miles from me who is snow free but another who is only 2 miles is half snow because there is a fir tree in line with them only 100 feet away. You may have to cut the tree or raise the antenna. If you are on a hilltop chances are there are others there with antennas, water towers, etc that can act as a reflector. This can help or hurt, you won't know until you try. Another tower close by can give a multipath cancelation right in the direction of the most users. It shows up as ghosts or unstable sync. Moving it slightly can make all the difference. Replies from the receiving stations on 2 meters describing the picture can save a lot of work later. On a hilltop you also receive a lot more and you could find your receiver jammed with interference from remote bases, FM repeaters, intermods, etc.

We ATVers don't like interference to our mode any more than FMers like sync buzz in their discriminators. It can save a lot of hassle and crystal buying if you coordinate your ATV freqs with other users on the band. In southern California we coordinated the 420 band in 1968. Before that it was power fights, physical threats, and cut coax. Until the ATVers, weak signal, FMers, and now AMSAT people got together and figured out how to use the band with least interference and cooperate with each other it was miserable for all. We let all the other mode users know where we were on 2 meters if they had any interference they thought was us. We all found that the buzz was the local FAA radar. A FMer would come on the two meter freq and complain. When we all turned off our TV xmtrs and it was still there it proved it was not us. Also the 3 bars in our picture wasn't from a FM repeater.

Before the last OSCAR went up with mode J in it we arranged to participate in the tests here to check interference to ground stations. As they flew it along our coast line we transmitted video on 434.0 along its path and toward known OSCAR ground stations. No interference was noted to the signal even when it got weak from the ATV gang. We have shown spectrum pictures of our video transmissions to them which prove that the energy in the sidebands above and below the carrier 1 mhz are down better than 40 db. Also with directional antennas and a 2 meter freq to call us on there has been no complaints. There has also been no problem with the weak signal group around 432. A little planning and cooperation can go a long way before the band fills up. This is especially true if you intend to use 439.25 as a repeater input. FM repeater inputs are on 440 to 445 with 5 mHz spacing. A mobile close to the repeater site can give you some interference. Your sound subcarrier at 443.75 or color burst at 442.83 could lock up a FM repeater input. With some band planning and a local coordinating committee made up of all users the FM repeater frequencies could be assigned from 445 down in 25 kHz channel spacings and as more came on and passed 444 they could avoid the subcarrier frequencies. We have found that the technical problems of all modes operating on the 420 to 450 band can be solved once the people conflicts are resolved.

So to conclude, using a two meter frequency for ATV coordination has many benefits both to the ATVer for his more efficient operating and bringing in more stations, but also to hams who are into other modes. 146.43 is only a suggestion. It can be any agreed upon frequency so long as it is a simplex frequency, and you let the local ARRL scm, freq coordination group and radio clubs know where you can be found. After all, we ATVers should be seen as well as heard.



MEDIUM SCAN with Don Miller W9NTP

HOW MANY MEMORIES FOR A DATA LINK?

W9NTP beacon will continue to transmit info on first 10 min of each hour (Saturday) on 29.150 mHz

A. One dynamic memory plus one static memory:
   1. Can load a fast scan picture into dynamic memory. Then load the image into the static memory during 1/30 of transmission time (2 F/S). This won't work because the transmission of data is stopped for 1/30 of transmission time during load.
   2. On receive it won't work either because of necessity of loading static memory into dynamic memory. Data won't wait during the loading time into dynamic memory.

   CONCLUSION: This amount of memory will not permit data link transmission.

B. One dynamic memory plus two static memories:
   1. Can load a fast scan picture into dynamic memory. Next load the image into the static memory. Transmit from this static memory while loading the dynamic memory and the other static memory. This will work as far as the transmission is concerned but the display at the sending end will blink during loading of the one dynamic memory.
   2. On receive one of the static memories can be loaded. After filling the first static memory the input data is transferred to the other static memory. During this loading time the first static memory transfers its data into the dynamic display memory. The picture will blink during the write time unless a gating of video data is made to the monitor during this writing time.

   CONCLUSION: System will work except on transmit the blinking display leaves something to be desired.

C. Two dynamic memories plus two static memories:
   1. Load the dynamic memories alternately on fast scan load. There is no problem with blink since the monitor is alternating between dynamic memories.
   2. One of the static memories is loaded during display time at fast scan rates. The loaded static memory then transmits. At the end of the transmission the second fast scan memory loads the second static memory and the process continues.
   3. On receive exactly the inverse occurs. One static memory is loaded and then the data is transferred to the dynamic memory. The viewing is from the other dynamic memory so there is no blink.

   CONCLUSION: This system is very satisfactory and lends itself to random loading of the static memories. If however the data is being received in a known format it is possible to use less static memory. See next system.

D. Two dynamic memories plus two partial static memories.
   1. The static memories are 1/16 field or 4-1K chips for each static memory.
   2. The dynamic memories are loaded alternately by fast scan as before.
   3. The non-viewing dynamic memory is loaded into each of the 1/16 static memories alternately. After 16 partial fields have been alternately transferred to the two partial static memories the process reverses and the other dynamic memory is used for data transfer.
   4. On receive the inverse happens. The two partial static memories are loaded and unloaded alternately. They load the dynamic memory not being viewed so there is no blinking on the screen. This system is very simple but does not allow for random loading of a complete static memory.

   CONCLUSION: The ultimate system would be to use two dynamic memories plus two static memories. One way that this could be done is to use a micro-processor for the two static memories. The micro-processor may be able to keep up with the data transfer (16 KHz) and use the scan converter for display and frame grab. An alternate way to involve a microprocessor with 32 K of memory would be to have multiplexed addressing and DMA access without going through the CPU.

   The discussion about blinking transmit displays can be helped somewhat if the camera is locked to the timing of the memory. This is not the case for the Robot 400 and probably will not be a good option.

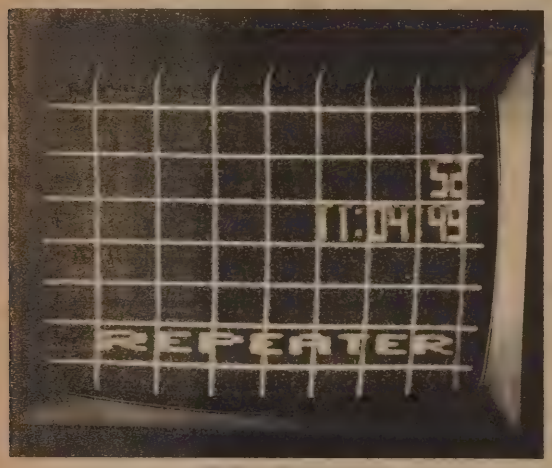
   What needs to be done is to change a Robot 400 to two dynamic memory system (obtainable from W9NTP) and build a static buffer memory from S-100 boards.

CROSSBAND REPEATER

DE W6ORG

Why a crossband repeater? Well if you are now in one of those areas in the country that has a inband repeater you prpbably know all the problems of keeping the transmitter out of the receiver. It is hard to have a wideband tv transmitter putting out watts right next to a receiver that is trying to receive microvolts just up the band. Even with lots of antenna separation and good 7 pole interdigital filters like the PSF438-ATV it takes a lot of patience and hard work to keep the leakage radiation out of the receiver. Most of the repeaters now on do not use the 7 pole and will not repeat color or sound subcarrier directly. With home computers becomming more popular and atvers putting them on the air, it would be nice to be able to see your own video comming back out of the repeater in real time.

With crossband to 1265 mHz the frequencies are so removed that very little filtering or separation is needed at the home QTH to see your own signal comming back. This is great for adjusting your own camera, etc without relying on others comments. Also you can see the results immediately without having to drop the carrier or ask for comments. A computer can be placed at the repeater site and even superimpozed over the incomming video to show signal strength, messiages, etc. The computer access can be thru your sound subcarrier. With less sophisticated filters required at the repeater site the bandwidth of the system does not have to be degraded. Color and computer graphics will come out great.



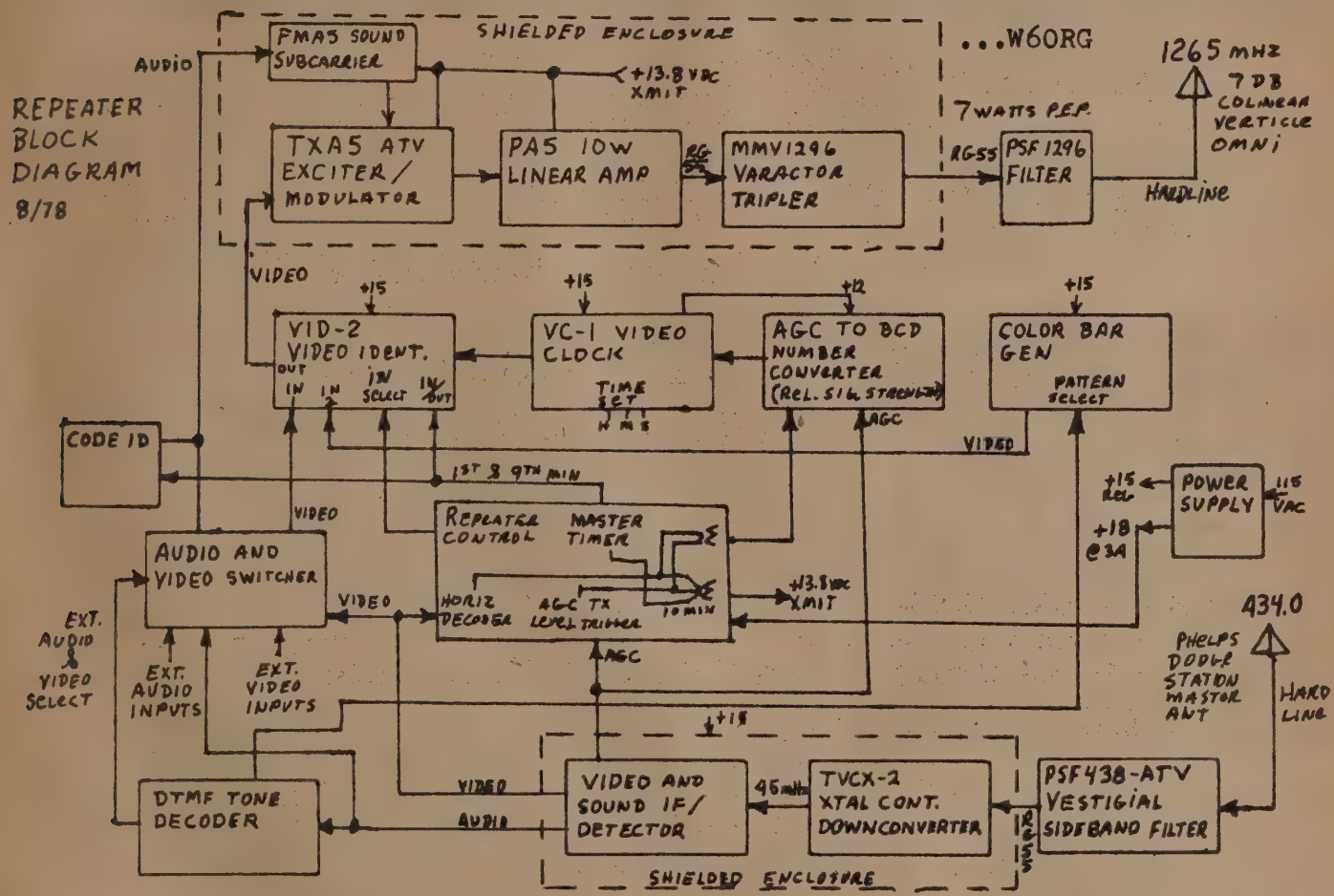
The picture at the left is a off the air polaroid shot of the video test pattern from the Los Angeles area crossband repeater. The number 52 above the seconds clock readout is the relative signal strength of the last received station. A simple 3 IC AGC voltage to 2 digit BCD converter drives the video clock board on the pins usually used for channel number. Actually any two BCD digits from any source such as temperature or xmtr power or status could be read out. The AGC was chosen so that we could record some data on how the smog or temperature inversion layer affects the 400 mhz signals. A graph was made of the relative number vs microvolts at the repeater receiver input.

The usual inversion in the LA area is at the 2000 ft level and the repeater is on a hillside at 2700 ft. Therefore during the day the signal has to go thru the layer to get repeated. Naturally the longer the signal passes thru the layer the more attenuation. At a 25 mile radius there was no change between daytime with the inversion in and night with it out. Stations at 35 miles had a 6 db difference, and our best DX of 97 miles to WA6PKX in La Jolla went from 70 microvolts during the night to nothing in daytime. So for DX here it seems that daytime is good for skip and nite time its better thru the repeater.

About 2 seconds after a station comes on, the signal strength circuit will take a reading. The reading is superimposed on the received video but if the station is too snowy he can drop his carrier and the repeater will stay on with the pattern shown for about a minute.

Another benefit of the agc readout is that amplifiers and antennas can be tested against others at the same qth. Just put on one then the other and check the readout and then the db difference from a agc vs microvolt or -dbm chart. It makes antenna measuring parties easier.

The crosshatch pattern was chosen as being the easiest to see in the snow and also good for adjusting the tv sets horizontal and vertical linearity. Color bars were first used but not enough stations have color receivers in the shack even though about 10% of the atvers here are on color. The pattern comes from a Heathkit IG 5240 color bar gen tap into with a VA-11 inv. module at the video gain pot wiper. The VA-1 inverter output is then fed to the camera 2 input of the video identifier VID-2. Later a binary counter will be incremented by a touch tone decoder off the subcarrier to allow users to select one of the 16 patterns available.



The only difference between a inband and crossband repeater is the varactor tripler. The tripler used is rated at 25 watts and just as has been found with class C highpower transistor amps they run linear enough at less than ½ rated power output. The 1296 interdigital filter is a simple 5 pole to keep sub harmonics from radiating. The 7db colinear is a scaled transposed coax section omni as can be found in the 73 Antenna Handbook (pg 29) but made with brass tubing. The antenna is another article though.

3½" high panel is dwarfted in the 6' rqck. Monitor at left is received pix and the one at right is the repeated. The round dial atop the panel is a thermometer showing a hot 90 degree summer day.

Repeater site. The hill is full of repeaters and remote bases... 10, 6, 2, 220 and 450 bands. The 7 pole interdigital effectively gets rid of a 50 watt remote base on 423 mhz on the front top antenna structure.

Users do not need any new transmitting equipment as the repeater input is in the 400 band. So, CALIF. uses 434.0 mHz. To receive a converter mounted at the antenna to save any line loss and a 18 dbd loop yagi antenna make up for the 7 db path loss difference between the two bands so that the snow level is about the same for the same distance. With a verticle separation of about 4 feet the 10 watts out of the 434 antenna does not get into the 1265 converter. Two frequencies do get thru though...the 3rd harmonic at 1302 and the 2nd harmonic at the image when tuned to about 1230. So 2 or 3 repeaters can be used or trunked in any area between 1240 and 1285 without interferance. The TVC-12 converts to channel 7 or 8 and tunes from the shack by means of a 10K pot and rotor cable.

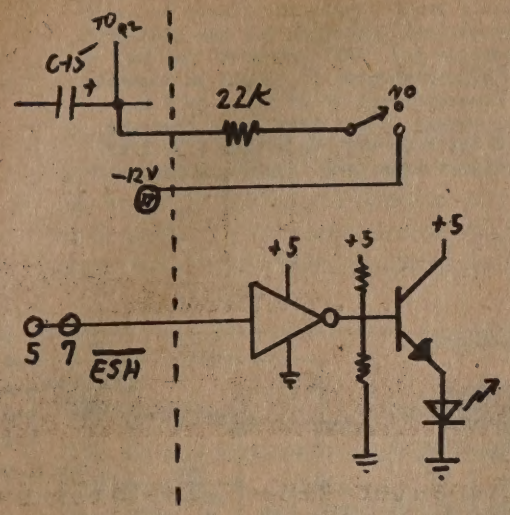
With one station on 400 and theother on 1200 (both simplex) you can have full duplex video and audio. No more having to take turns or wait for the long winded. So even if you dont have a crossband repeater in operation the addition of some 1200 equipment can give a new demension to your activity. Maybe interconnect your two microcomputers via tones on the sound subcarrier and play interactive games in real time.

Verticle antennas are used mainly because it is much easier to get omni directional gain with this polarization than with horizontal. Tests we have made seem to back up a extensive U.S. Army report that above 300 mHz one polarity does not have any general advantage over another. Below 300 though horizontal is best. Over 100 mile paths we found that on the 400 meg band there were conditions that gave up to 4 db advantage to one polarity over another but would not repeat or would change to favor the other polarity. We only noted a rotation of no more than 15 degrees also. So it says that on UHF you have to be the same polaity at both ends even on long haul or suffer up to 20 db cross polarization loss. This subject is always great to stir up discussion. I suggest that you make your own tests with the aid of the repeater and AGC digits.

73, Tom O'Hara W6ORG

SIMPLE MODS FOR THE ROBOT TO PRODUCE FRONT COVER PIX K89FO

Robot 400 ADD



V reset, saves the "bottom" half pix
Use a momentary contact push button.
Press and release to reset

Tuning aid, LED blinks on sync tone
helps tune in for better pix.

Change R-321 (width control) from 1
k ohm to 10-25 K ohm. Rotate to
produce two full pix. Just before
V sync (during gray scale lines)
switch input to OTHER, then switch back
immediately after sync. now two more
pix will be written on bottom half of
screen. All new pix will be at the top
of the screen. Use hold and V reset to
continue to re-write top half only,
otherwise you will erase bottom pix.

Factory mod, change R 136 from 10 K
to 47 K (snatch circuit).

SSTV FREQUENCY TEST OSCILLATOR

By R.F. Stone W3EFG

INTRODUCTION -

If you are either on Amateur Slow Scan Television or have been thinking about getting envolved in this exciting new field of amateur radio you will find the test oscillator described a very useful device. Basically what it provides is a highly percise source of the basic frequencies envolved in Slow Scan Television. The SYNC Signal is a 1200 Hz. freq. The Black Frequency is 1500 Hz. and the White Frequency 2300 Hz. While it is beyond the scope of this article to get into the details of the Slow Scan Television Standards surfice it to say the system is an FM system built around these frequencies. Since the entire system is based on accurately knowing that the equipment is set up for these particular frequencies having a small self contained audio osc. with discrete frequencies well known and accurately calibrated will be extremely valuable not only in initially setting up the equipment but in checking the equipment periodically for normal operation. The requirement for this oscillator is one of good stability and with immunity to temperature variations and immunity to PWR. supply voltage changes. The design was inspired by an article sometime ago that was in ELECTRONICS WORLD MAG. June 1864 intitled TWIN TEE OSCILLATORS FOR ELECTRONIC MUSICAL INSTRUMENTS. The requirement for tone oscillators in electronic organs has many the same constraints that we have described earlier. However, to be useful it must be very simple and easy to duplicate. The orginal version of this oscillator was made for remote control of repeaters while in the Syracuse Area and was designed for tones in the 400 Hz Redion. Another version used the tone 2905 Hz and was connected to a telephone dial for secode tone operation. So the basic design has been proven in extremely rough service mobile and otherwise and has found to be very stable and will hold a frequency setting over long periods of time.

APPLICATIONS -

Perhaps one of the most useful applications of this oscillator is setting up the FM Modulator in a fast scan to slow scan converter such as the design described in "HAM RADIO" July 1971 or a flying spot scanner modulator.

It is necessary to accurately set up and periodically check the Sync Frequency, Black Frequency and the White Frequency in order to assure that the transmitted picture will have the full excursion between black and white and will have the optimum contrast range. Also provided in this oscillator, a fourth frequency which may be set anywhere in the video range or beyond. The video range being 1500 Hz to 2300 Hz I found it useful to set the fourth frequency at 2500 Hz which is outside the normal range of the band but will enable one to check proper operation of the low pass filter that is essential between the output of the Slow Scan TV Equipment and the transmitter to avoid putting out spurious signals beyond the audio range permitted by the FCC. A second application envolves the use of a SSTV monitor or oscilloscope SSTV converter or adaptor similar to the one in QST. When building a monitor or converter it's desirable to have a frequency source to set up the SYNC and video discriminator tuned circuits. It is also useful to have an oscillator that can be periodically connected to a monitor to set up the monitor brightness and contrast. Of course the preferred method for doing this is to have a bar chart made up to present the full range of black and white and various shades of gray. However in place of such a tape the test oscillator will enable you to set up the white and black level quite accurately and also determine if the SYNC circuit is correctly tuned. A third application is very unusual using earphones connected to the output of the test generator and assuming one has a musical ear it is possible to listen to the output of a SSTV signal by a loudspeaker and get some idea of the black and white excursions. Assuming that the signal is predominately white one can auraly compare the predominate tone and by comparing this tone with the proper frequency generated in the earphones a quite accurate determination of the excursion can be obtained. This is particularly useful when listening to an off the air signal and requires no oscilloscope or other direct connection to the receiver.

DESIGN DETAILS -

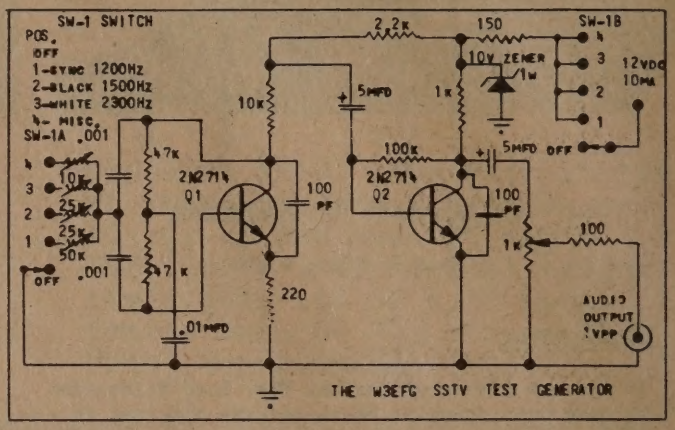
The simplicity of the circuit is quite obvious from the schematic shown. It consists simply of two transistors and a few components on a small printed circuit board. It should be mentioned that the P.C. Boards are not available from W3EFG but perhaps some enterprising ATVer may duplicate the layout given and make such boards available. It will be noted that Silicon Epoxy Transistors indicated as Type 2N2714 are used in the oscillator. Substitute silicon transistors may be employed. The only requirement is that they have a Beta of 100 or more. The four trimpots indicated are the Trimpot 3009P Series. They are available for about $1.00 each. It is essential that the capacitors marked MICA be of this type since they determine the temperature stability of the unit. A two pole 5 position rotary switch is used to apply power to the unit or select the proper tone. It is noted that an external 12 VDC battery may be used instead of the 12 VDC circuit feeding the 10 volt Zener. Since the power requirement of approximately 10 MA is used, the small battery should last for many months. A 1000 OHM Level Pot is shown however this may be omitted and the output from the 5MF capacitor fed directly through the 100 OHM resistor to the output terminal. The output is almost a pure sinewave having a nominal voltage of approximately 1 VPP across 500 OHMs however it also may feed a lower or higher impedance load with correspondingly different outputs. The purpose of the 100 PF capacitors-between collector and emitter of each transistor is to reduce the frequency response and therefore lower immunity to stray RF that may be introduced into the ciruit through the wiring. If the unit is to be used in the vicinity of a strong RF field from an amateur transmitter its suggested that the entire unit be enclosed in a metal box and an RF choke be included both in the power lead and the output lead.

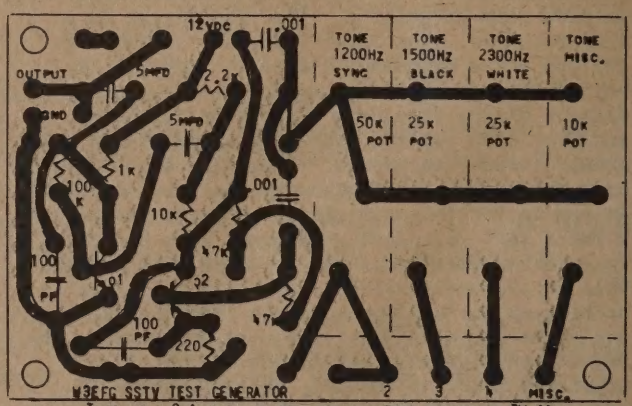
PACKAGING AND OTHER APPLICATIONS -

The photographs shows the completed board with attached rotary selector switch ready to be put into a suitable container. It is recommended that the unit perhaps with battery be enclosed in a small mini box with the rotary switch, level control and output jack preferable a phone jack to expedite plugging in earphones.
Another version is shown in a 4" x 2" x 1½" minibox. This unit has the four pushbuttons for remote control or selective calling described earlier. It has a PJO-68 three circuit plug and corresponding jack for carbon microphone that may be inserted into a transmitter. The off position of a three pole slide switch connects the microphone - straight through the on position - energizes the unit and keys the transmitter and allows the selection of one of four tones to be employed.
Incidentally with the advent of tone activation or control of the many FM repeaters both amateur and MARS, other applications of this basic circuit are immediately obvious. With the components value indicated the circuit will tune very nicely to 2905 Hz which is the secode frequency used for remote control and operation.

SET UP AND ADJUSTMENT -

It is essential that the frequency be set up accurately but once set up should hold the adjustment over many months with only periodical checking necessary. The one that is described by the author was set up initially and found to be quite accurate over about a years intermittent use. The preferred method of setting the tones is using a frequency counter. If however the counter is not available and an accurate calib. audio oscillator is available the use of a oscilloscope and the LISSAHOUS -Figure Technique see "ARRL HANDBOOK" may be employed. Using a counter it should be possible to get the frequency set to within 1 or 2 Hz. Once set accurately it has been found that the stability of the unit will be within 1 or 2 Hz over a relativity wide temp. range and battery voltage.





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SLOW SCAN TELEVISION AWARDS

Amateur Television Magazine is now offering a series of award certificates for SSTV activity ranging from a basic award through several levels of difficulty to a Master Scanner award. The beginning level certificate requires the SSTV operator to have confirmed five SSTV contacts on each of any five ham bands, a total of 25 contacts. The bands used for all the levels may be any combination of the contestants

In addition to the normal frequency bands, the use of QSCAR may be used as 2 bands for any two OSCAR modes. i.e., 5 contacts via 450/144 oscar would count as 1 band for the basic certificate.

5 SSTV QSO's	on each of any	5 bands,	25 contacts
6 SSTV QSO's	on each of any	6 bands,	36 contacts
7 SSTV QSO's	on each of any	7 bands,	49 contacts
8 SSTV QSO's	on each of any	8 bands,	64 contacts
9 SSTV QSO's	on each of any	9 bands,	81 contacts
10 SSTV QSO's	on each of any	10 bands,	100 contacts
25 SSTV QSO's	on each of any	10 meters,	25 contacts

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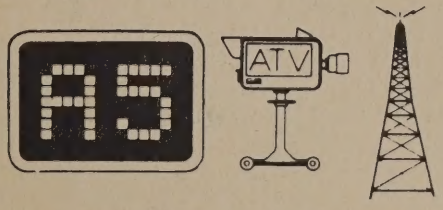

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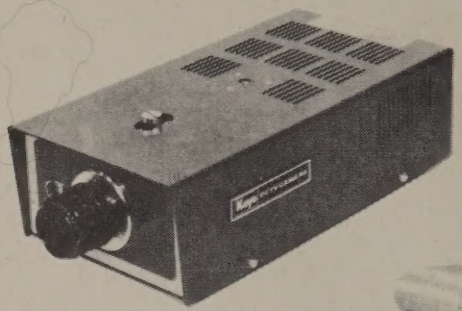

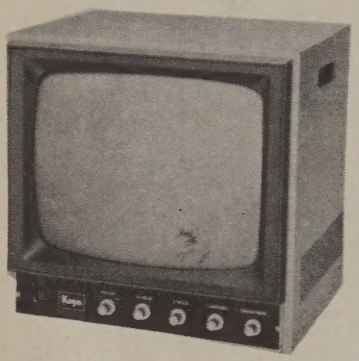

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